Environmental Assessment

South Warner Grazing Analysis

United States
Department of
Agriculture

August, 2014

Forest Service

Pacific Southwest

Warner Mountain Ranger District
Modoc National Forest
Modoc County & Lassen County, California

T38N, R14E Sec. 1-5, 10-16, 22-23;
T38N, R15E Sec.17, 20, 29, 32;
T39N, R14E Sec. 2-3, 5-11, 14-17, 20-29, 32-36; and
T39N, R15E.Sec. 32
Mt. Diablo Meridian

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CHAPTER 1: PURPOSE and NEED

1. Introduction

The Warner Mountain Ranger District proposes to authorize the continuation of cattle grazing within the Outlet, West Valley and Parsnip Cattle and Horse Grazing Allotments (herein referred to as South Warner Grazing Allotments) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations.

This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the No Action Alternative and the four Action Alternatives, in response to public comment and grazing permittee issues. The document is organized into four chapters:

Chapter 1. Purpose and Need. The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and identified the significant issues that drive the analysis.

Chapter 2. Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's Proposed Action as well as alternative methods for achieving the stated purpose and need. This discussion also includes possible mitigation measures. These alternatives were developed based on key issues raised by the public, the interdisciplinary team (IDT), and other agencies.

Chapter 3. Environmental Consequences: This chapter describes the physical, biological, and human environments potentially affected by the Proposed Action and alternatives, and describes the potential effects of the Proposed Action and alternatives, including the No Action Alternative.

Chapter 4. Consultation and Coordination: This section provides a list of preparers and agencies consulted during the development of the EA.

Appendices: The appendices provide more detailed information to support the analyses presented in the EA.

Additional documentation, including more detailed analyses of project-area resources, may be found in the Project Record located at the Modoc National Forest located 225 W. 8th St., Alturas, CA 96101.

The project will implement allotment management plans and is not authorized under the Healthy Forest Restoration Act and is thus subject to the objection process as 36CFR 218, Subparts A and B.

1.2 Analysis Area

This environmental analysis will cover three existing grazing allotments (Outlet, West Valley, and Parsnip) that are geographically similar and in close proximity to each other (Figure 1). The Outlet, West Valley, and Parsnip Allotments are located in Modoc and Lassen Counties approximately 10 miles east of Likely, California.

Landmark locations include Parsnip Mountain, Parsnip Creek, and South Fork Pit River, located between 4,600 and 7,160 feet in elevation.

The assessment area covers about 17,970 acres, 95 percent of which (17,286 acres) are National Forest System (NFS) lands, with the remaining acreage under private ownership. Access to the three allotments is by County Road 64 and Forest Service System Roads 39N19 and 39N34 with minimal branching Forest System Roads. There is limited access into these allotments. The terrain can be described as gentle topography with rolling hills and scattered flats. The area has a moderate climate, and annual precipitation varying between 20 to 40 inches. Generally, the rainfall occurs during low to moderate intensity rain in the winter, generally turning to snow in the mountains.

Within the Warner Mountains, volcanic rock, "flood basalts", and rhyolite ash are commonly found on or near the soil surface with andesites, volcanic mudflow deposits, and rhyolitic intrusives also occurring. The Mollisol soil order is commonly found in the surrounding area along with some Inceptisols and smaller areas of Histosols. Soils usually exhibit mesic to frigid temperature regimes, xeric soil moisture regimes, and mixed to smectitic mineralogy. Soils are generally well-drained, are loamy, clayey, or sandy, and can be shallow to very deep. The allotments are characterized by volcanic uplands composed of lava plateaus and narrow stream valleys connected to the Pit River drainage (USDA, 2011).

Western juniper (*Juniperus occidentalis*) and a minor component of ponderosa pine (*Pinus ponderosa*) form the overstory in the lower elevation foothills of the Outlet, West Valley and Parsnip allotments. Understories consist of shrub cover interspersed with annual and perennial grasses. Sagebrush (*Artemesia* spp.), rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia tridentata*), and mountain mahogany (*Cercocarpus ledifolius*) are typical shrubs found throughout the allotments. Sandberg bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoregeneria spicata*), giant ricegrasss (*Achnatherum coronatum*), and Lemmon's needlegrass (*Achnatherum lemmonii*) are common native grasses. Cheatgrass (*Bromus tectorum*), an invasive annual grass, is also common. Meadows and riparian areas support sedges (*Carex* spp.), rushes (*Juncus* spp.), slender wheatgrass (*Elymus trachycaulus*), Kentucky bluegrass (*Poa pratensis*), bentgrass (*Agrostis* spp.) and many other herbaceous species. Woody riparian species include aspen, willow (*Salix* spp.), cottonwood (*Populus balsamifera* ssp. trichocarpa), and dogwood (*Cornus sericea*).

The Parsnip Inventoried Roadless Area (IRA) is within portions of the analysis area. Within the Parsnip Allotment there are 5,280 acres of IRA and within the West Valley Allotment, there are 2,941 acres of IRA. Process requirements for review of activities within IRA are provided by the Forest Service Chief's letter of May 31, 2012 and Regional Forester Randy Moore's letter and attachment of November 5 and 6, 2009. A briefing paper and map was submitted to Regional

Office for review and State Consultation for the proposed activities in the Parsnip Inventoried Roadless Areas. The project was approved to move forward with the activities proposed in the analysis area. Approximately 98 acres of the West Valley Treatment Area and the entire Parsnip Riparian Treatment Area (157 acres) falls within the designated Inventoried Roadless Area (IRA) as defined in 36 CFR 294.11.

36 CFR 294 Subpart B – Protection of Inventoried Roadless Areas includes the definition, characteristics and prohibitions of roadless areas. 36 CFR Part 294.13 of Subpart B states timber may be cut, sold or removed in IRA's if the Responsible Official determines that the following circumstance exists:

The cutting, sale or removal of generally small diameter timber is needed for one of the following purposes and will maintain or improve one or more of the roadless area characteristics as defined in 294.11.

> (i)To improve threatened, endangered, proposed or sensitive species habitat; or
>
> (ii) To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period.

The rule also states that due to great variation in stand characteristics between vegetation types in different areas a definition of what constitutes generally small diameter timber is not specified in the rule. Such determinations are to be made through project specific or land and resource management plan NEPA analyses, as guided by ecological considerations.

The proposed treatments will remove only non-old growth western juniper. The existing condition described on page 7 of the Silviculture report as well as Analysis of the Effects of Treatment on pages 12 and 13 demonstrate that the majority of trees removed will be from the lower diameter classes. "Generally small diameter" in these stands is represented by a combination of dbh and their physical characteristics with respect to old growth attributes rather than a pure function of dbh.

Western juniper is generally not considered a "timber" species as specified in the roadless rule. This is a tree species that typically occupies open sagebrush grasslands and is managed as range species and not for commercial timber value or timber associated wildlife habitat. As described in the roadless rule, determination of what constitutes "generally small diameter timber" will consider future effects and development of the stands and relationships with associated plant and animal communities on the site and surrounding landscape.

This project proposes to implement the Sage Steppe Ecological Restoration Strategy which will restore these areas to desired habitat conditions reflecting ecological processes that existed pre-European settlement. Treatments will increase the diversity of plant and animal communities, and return the areas to a condition that is more representative of a natural appearing landscape. These are both listed characteristics of a roadless area as per 36 CFR 294.11.

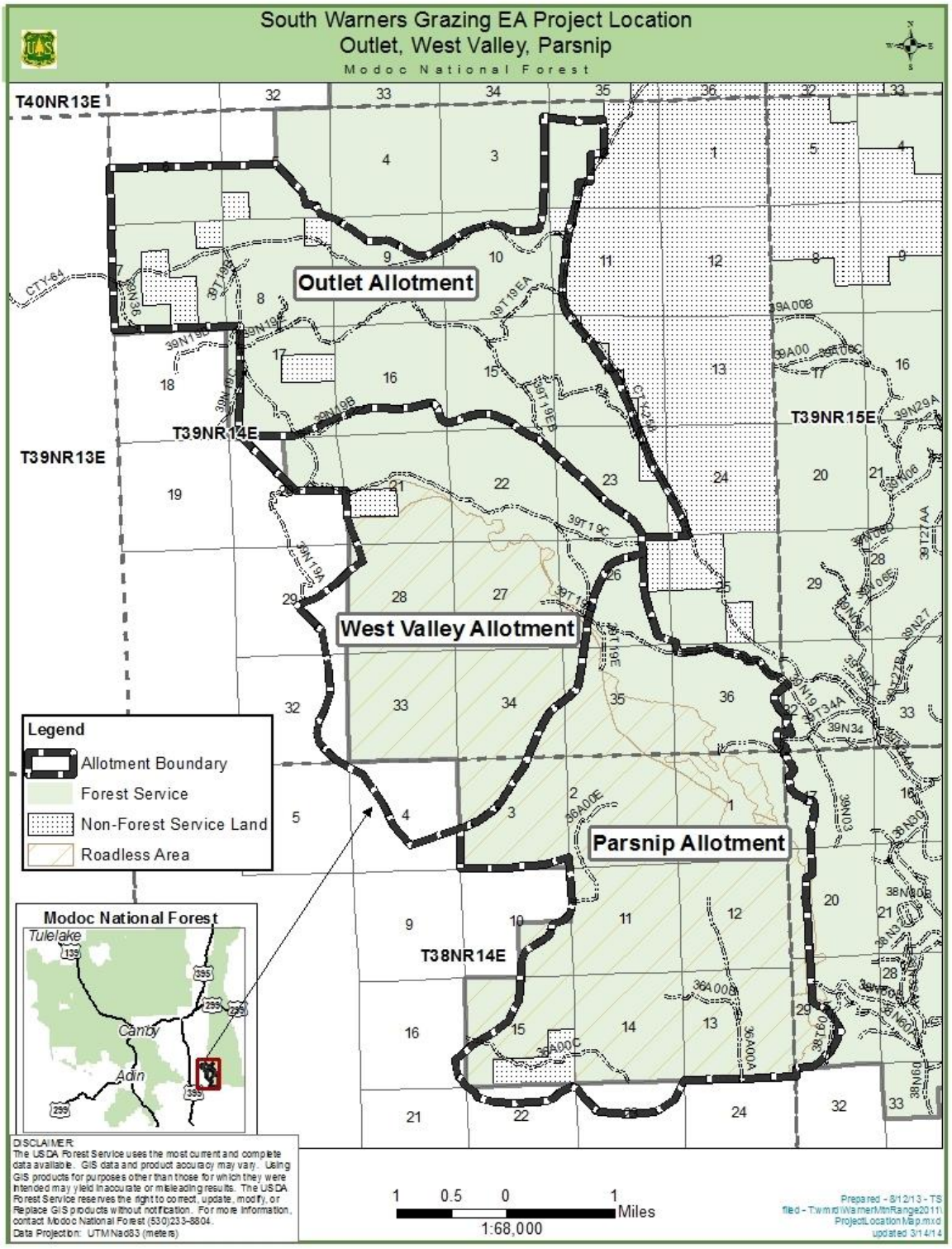


Figure 1: Allotment Map.

1.2.1 Grazing Administration

Authority to manage rangeland resources is derived from laws enacted by Congress to authorize the Secretary of Agriculture to administer the National Forest System (NFS) lands and issue necessary regulations. Where consistent with the goals, objectives, standards and guidelines of Forest Plans, Federal regulations direct the Forest Service to manage forage-producing lands for livestock grazing.

The Forest Service has an established process for grazing administration. An allotment is a designated area of land capable and suitable for domestic livestock grazing. Term grazing permits are generally issued for a period of 10 years, and authorize a permittee to graze livestock on their designated allotment(s). Grazing on an allotment is conducted in accordance with an Allotment Management Plan (AMP) which is incorporated into the term grazing permit.

In 1991, the Modoc National Forest Plan (Forest Plan) was signed and has been amended several times to address new issues. This plan provides overall guidance for multiple-use and sustained yield of goods and services from the Forest. Forest plans determine management activities and permittee uses, and establish programmatic direction including goals, objectives, standards, guidelines and monitoring requirements.

The Proposed Action of this project was designed to comply with the Forest Plan and subsequent amendments. Authorization to graze this specific area is needed through a project level NEPA decision (FSH 2209.13 Chapter 90). If the decision is made to authorize livestock grazing on the allotment, the existing AMP would be revised to implement the applicable management direction from the NEPA decision.

Permittees and the U.S. Forest Service meet, at least annually, to discuss Annual Operating Instructions (AOI) that specify actions needed to implement the management direction set forth in the project-level NEPA decision such as grazing strategies, range improvement needs, monitoring, and any concerns other Forest Service resource specialists raise. Communications continue throughout the grazing season. This allows the Forest Service and permittee to respond promptly if an issue arises to reduce grazing impacts or conflicts. Permittees are encouraged to participate with Forest Service personnel in monitoring, reporting livestock moves, and range improvement (water sources, fences, and corral) needs.

Allotments are managed with strategies that include riding, use of mineral supplements and/or salting pastures (units) to facilitate livestock control and distribution. Range improvements such as: fences, water troughs, stock drives, and corrals are important for livestock control and distribution. Maps and list of existing and proposed improvements can be found in Appendix C, South Warner Analysis Area, Existing and Proposed Range Improvements.

In general, Outlet, West Valley and Parsnip Allotments have been grazed by cattle since the early 1900’s. Actual dates and livestock numbers for early grazing were not well documented until 1906 when grazing fees began to be collected on forest reserves. Oral histories generally indicate much higher livestock grazing numbers on these areas in the early 1900s than the present. Over time, infrastructures such as water sources and fences have been developed in order to improve livestock management and distribution. More complete allotment descriptions are included in the Rangeland specialist report in Chapter 3 and in the projects files.

Currently, the three allotments (Outlet, West Valley and Parsnip) are permitted to two different local livestock ranchers. An Allotment Management Plans (AMP) was completed for all three allotments in 2002.

Outlet Allotment:

The Outlet Allotment is 5,608 acres and is under a three-pasture deferred early-season grazing system with re-growth. The current management strategy allows for livestock grazing from the time range-readiness is determined until utilization standards are reached, generally between May 1st and June 30th.

The most recent permit was issued to the permittee in 2013. The permitted use on Outlet Allotment is 173 cow/calf pairs between the dates of 5/1 and 6/30, and 55 pair from 5/15 to 6/30 for 432 Head Months (HM).

Name of the Allotment	Season of Use	Permitted Livestock Numbers	Head Months (HM)/Animal Unit Months (AUMS)
Outlet	5/1-6/30	173	347/458
Outlet	5/15-6/30	55	85/112

Table 1: Outlet Allotment Current Permitted Use.

Within the Outlet Allotment, Reach 311 of the South Fork Pit River was rated as proper functioning condition in 1999 and as functioning at risk with an upward trend in 2011. Reach 313 of the South Fork Pit River was rated as proper functioning condition in 1999 and as functioning at risk in a downward trend in 2011. Juniper encroachment was also thought to be responsible for a reduction of understory components in the mountain sage and low sage types. Where juniper invasion was advanced, shrubs had generally been eliminated from the plant community, bare ground was higher than expected for the site, and cheatgrass was abundant.

Within the Allotment, an historical site was initially recorded in 1972 as a "chipping station" of about 2 acres in size. In 2011 this site was re-recorded to bring the documentation up to current standard. It is a temporary camp of almost 20 acres in size. At least two areas were noted where cattle "shade up" under trees and have perhaps been wallowing in dust. The soil in these areas is loose and silty. In the second area there is the lack of native vegetation cover compared to the surrounding areas, where that vegetation is still intact.

West Valley Allotment:

The West Valley Allotment is 5,354 acres and is under a two-pasture deferred early-season grazing system with re-growth. The current management strategy allows for livestock grazing from the time range readiness is determined until utilization standards are reached, generally between May 1st and June 30th.

The most recent permit was issued to the permittee in 2013. The permitted use on the West Valley Allotment is 315 cow/calf pairs between the dates of 5/1 and 6/30 for 632 Head Months (HM). The use has been split between two permittees in the past with one permittee grazing 140 cow/calf pairs and another with 175 cow/calf pairs. Although, the permittee that grazes the 175 cow/calf pairs has not grazed on the allotment since 1996.

Name of the Allotment	Season of Use	Permitted Livestock Numbers	Head Months(HM)/Animal Unit Months (AUMS)	Current Livestock Numbers	Head Months/Animal Unit Months
West Valley	5/1-6/30	315	632/834	140	281/371

Table 2: West Valley Allotment Current Permitted Use.

Within the West Valley Allotment, A fen, about 1/10 of an acre in extent, was discovered just above a valley constriction off the main road (39N19) that runs through the allotment. The fen was also pock-marked with hoof-prints across its entire area, exposing peat on its surface.

Parsnip Allotment:

The Parsnip Allotment is 7,016 acres and is a two pasture grazing system (north and south), with an additional Special Use Pasture. The Special Use Pasture is grazed season long in conjunction with co-mingled private land. The remainder of the Parsnip Allotment is grazed utilizing two pastures. The north pasture is grazed first for approximately one month and then the permitted livestock are moved through the gate at Little Parsnip Springs onto the south pasture to finish the season. In addition there is a "crossing permit" allowing livestock to trail through this allotment between the West Valley and Blue Lake Allotments. Grazing has not occurred on this allotment for the last several years. The current management strategy allows for livestock grazing from the time range readiness is determined until utilization standards are reached, generally between May 1st and September 30th on the special use pasture and July 1st and September 30th on the rest of the allotment.

The permitted use on the Parsnip Allotment was 15 cow/calf pairs between the dates of 5/1 and 9/30, 75 Head Months (HM) on the Special Use Pasture and 50 cow/calf pairs between the dates of 7/1 to 9/30 for 151 HM. This allotment has been rested via non-use for the last 18 years although there has been incidental use through authorized livestock crossing.

Name of the Allotment	Season of Use	Permitted Livestock Numbers	Head Months (HMs)/Animal Unit Months (AUMS)
Parsnip#	7/1-9/30	50	151/199
Parsnip Special Unit#	5/1-9/30	15	75/99

Table 3: Parsnip Allotment Current Permitted Use.
#this allotment is presently not grazed.

Within the Parsnip Allotment, Reach 331, Little Parsnip Creek, was rated as functional-at-risk in its entirety. The upper section of the stream, just below the headwaters spring is non-functioning. The spring development that forms the headwaters of the channel is no longer connected to an off-site trough; therefore the exclosure has been left open to allow trailing cattle access to drinking water.

Within the allotment, there is an historical site that was initially recorded in 1983 as a temporary camp with an area of 17.2 acres. It was re-recorded in 2011 at 33 acres. The grazing impact to the site consists of extensive, well-used cattle trails to a water source within the site. The trails are on a slope, which may contribute to the erosion of cultural materials within the site.

1.2.2 Objectives of the Range Management Program for All National Forests

- Manage the range vegetation to protect basic soil and water quality resources, provide for ecological diversity, improve or maintain environmental quality, and meet public need for interrelated resource uses [FSM 2202.1 (1)].
- Integrate management of range vegetation with other resource programs to achieve multiple use objectives specified in the Forest Plan [FSM 2202.1 (2)].
- Provide livestock forage, wildlife food and habitat, outdoor recreation, and other resource values dependent on range vegetation [FSM 2202.1 (3)].
- Contribute to the economic and social well-being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood [FSM 2202.1 (4)].
- Provide expertise on range ecology, botany, and management of grazing animals [FSM 2202.1 (5)].

1.2.3 Rangeland Suitability and Capability

1.2.3.1 Capable Rangelands
Capable rangelands are areas of land with the potential to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. This includes lands that are accessible to livestock, produce forage or have inherent forage producing capabilities, and can be grazed on a sustained basis under reasonable management practices.

1.2.3.2 Suitable Rangelands
Suitable rangelands are locations where the appropriateness of applying certain resource management practices to a particular area of land are determined by an analysis of the economic and environmental consequences. Suitable rangelands take into account unique habitat, key wildlife areas, social conflicts, noxious weed populations, administrative or study areas, and areas of rehabilitation. Rangeland suitability is established either to provide prescriptive management direction for project-level analysis and subsequent NEPA decisions or as a decision to not graze designated areas. Typically, areas are reviewed to see if livestock grazing is

compatible with management area emphasis, uses and values identified. Suitability also looks at what uses are foregone with livestock grazing.

1.2.3.3 Allotment Conditions

Approximately 4,678 acres in Outlet, 2,696 acres in the West Valley allotment, and 3,867 acres in Parsnip were identified as capable and suitable for livestock grazing. The rangeland capability and suitability determinations for the allotment were validated in the planning process by site-specific data including long-term range condition and trend studies and issues raised through the scoping process. Areas that were not identified as capable and suitable would not typically qualify as primary or secondary rangelands (defined in 1.2.6), but are not necessarily off-limits to grazing (unless administratively closed) and may receive incidental livestock use.

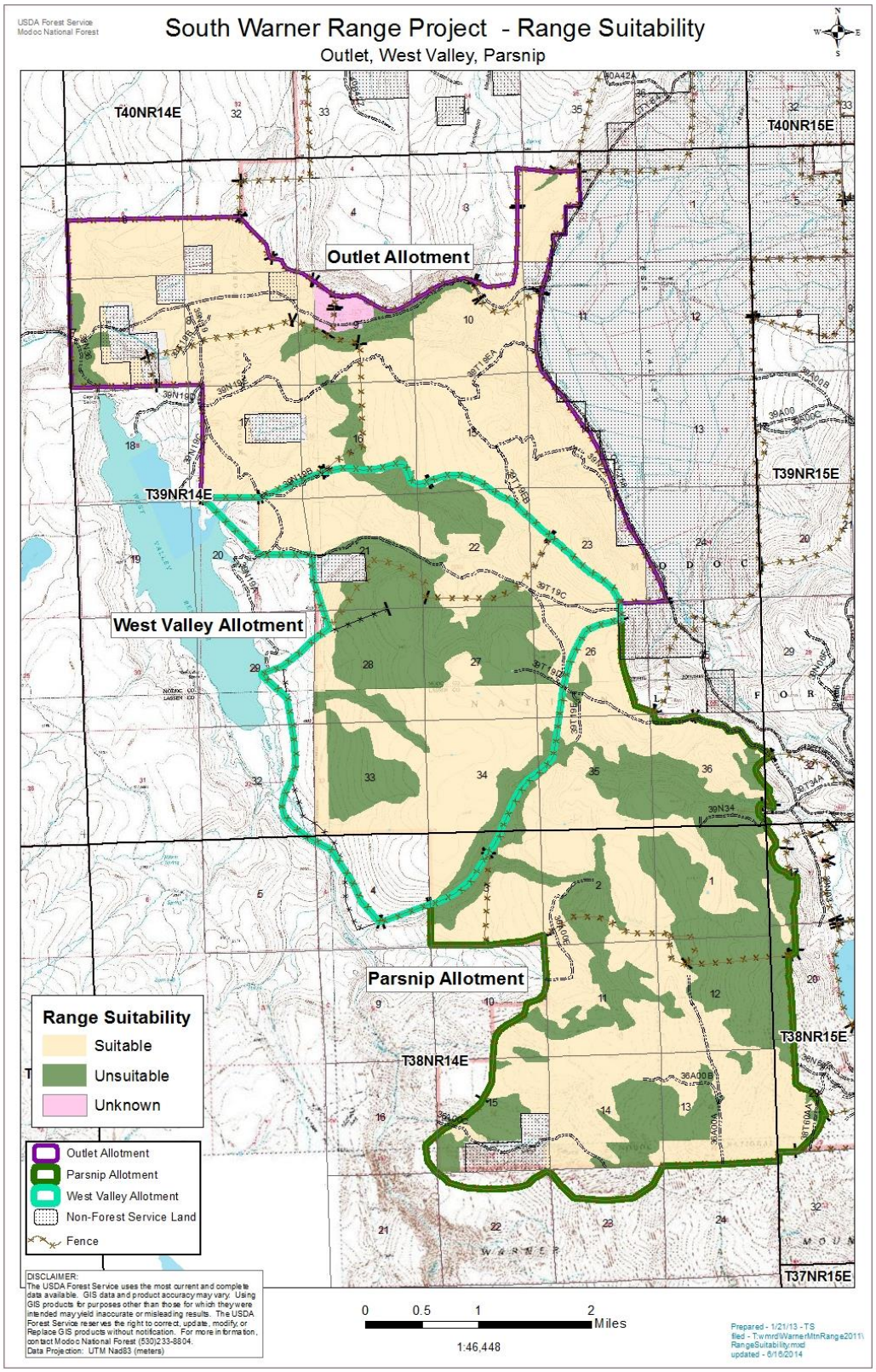


Figure 2: South Warner Range Suitability

1.3 Management Direction that Influence the Scope of this Environmental Assessment

All of the following documents are incorporated by reference.

1.3.1 Forest Plan Direction (1991)

In November 1991, the Regional Forester signed the Land and Resource Management Plan (LRMP) ROD. This plan lists the forest-wide Standards and Guidelines as well as more site-specific Standards and Guidelines. This plan was amended by the SNFPA.

The Forest Plan sets forth in detail the following:

- Grazing utilization standards based on range condition and annual precipitation.
- Suitability requirements for range lands.
- Requirement to use the Experimental Stewardship Program.
- Management objective for all rangelands to be in satisfactory ecological condition.
- Guidance to build and maintain structural range improvements to implement grazing systems.
- Requirements to monitor range condition and trend, as well as fish habitat and water quality.
- Requirement to make lands allocated to livestock grazing available for use by qualified livestock operators. Prepare Allotment Management Plans (AMP) and revise every 10 years. Prepare annual operating plans for each allotment.

The Forest Plan specified different management strategies for each allotment. The B strategy controls livestock numbers so that livestock use is within present grazing capacity. Improvements are minimal. The C management strategy seeks full utilization of forage available using cost effective management systems and techniques (Modoc LRMP, p. O-1). The Outlet and Parsnip allotments follow the C livestock management strategy while the West Valley Allotment follows the B strategy.

The project falls within the Fitzhugh (Outlet) and Patterson (West Valley and Parsnip) Management areas on the Southern portion of the Warner Mountain Ranger District (Modoc LRMP, pp. 4-161, 4-169).

The management areas are a contiguous unit of land with similar topography, geology and resources uses. The Forest is divided into 22 management areas which enable land managers to implement the Forest Plan. Range allotment boundaries do not always coincide with management area boundaries. Management areas list their prescription allocations, range allotment strategies and their own unique standard and guidelines.

1.3.2 Sierra Nevada Forest Plan Amendment FEIS ROD 2004:

In January 2004, the Regional Forester signed the SNFPA final supplemental Environmental Impact Statement (EIS) Record of Decision (ROD), which replaced the 2001 Record of Decision

on the SNFPA and final EIS. The 2001 SNFPA final EIS and Record of Decision are incorporated by reference in the 2004 Record of Decision on the SNFPA final supplemental EIS.

1.3.3 Sage Steppe Ecosystem Restoration Strategy (SSERS) FEIS 2008:

The Modoc National Forest includes approximately 617,000 acres of sage steppe ecosystem, which is important habitat for numerous wildlife species as well as providing recreation such as hunting, fishing and wildlife viewing, and resource use opportunities including livestock grazing and firewood gathering. The Sage Steppe Ecosystem Restoration Strategy implemented since 2008 focuses on the restoration of sage steppe ecosystems that have come to be dominated by juniper, as the density of Western juniper has increased over the landscape. The programmatic SSERS FEIS can be tiered to when doing site specific NEPA.

The restoration strategy will broadly identify appropriate restoration methodologies by ecological conditions; provide guidelines for design and implementation of effective restoration treatments for restoration areas to be analyzed site specifically over a 50-year horizon. The purpose of this Restoration Strategy is to restore sage steppe ecosystem processes and vegetation conditions that resemble historic mosaics, so that historic fire return intervals in sage steppe ecosystems can be sustained.

In this South Warner Grazing EA, alternative 2, 3 and 5 will implement strategies identified in the Sage Steppe Ecosystem Restoration Strategy to treat areas with excessive juniper encroachment within the West Valley Allotment.

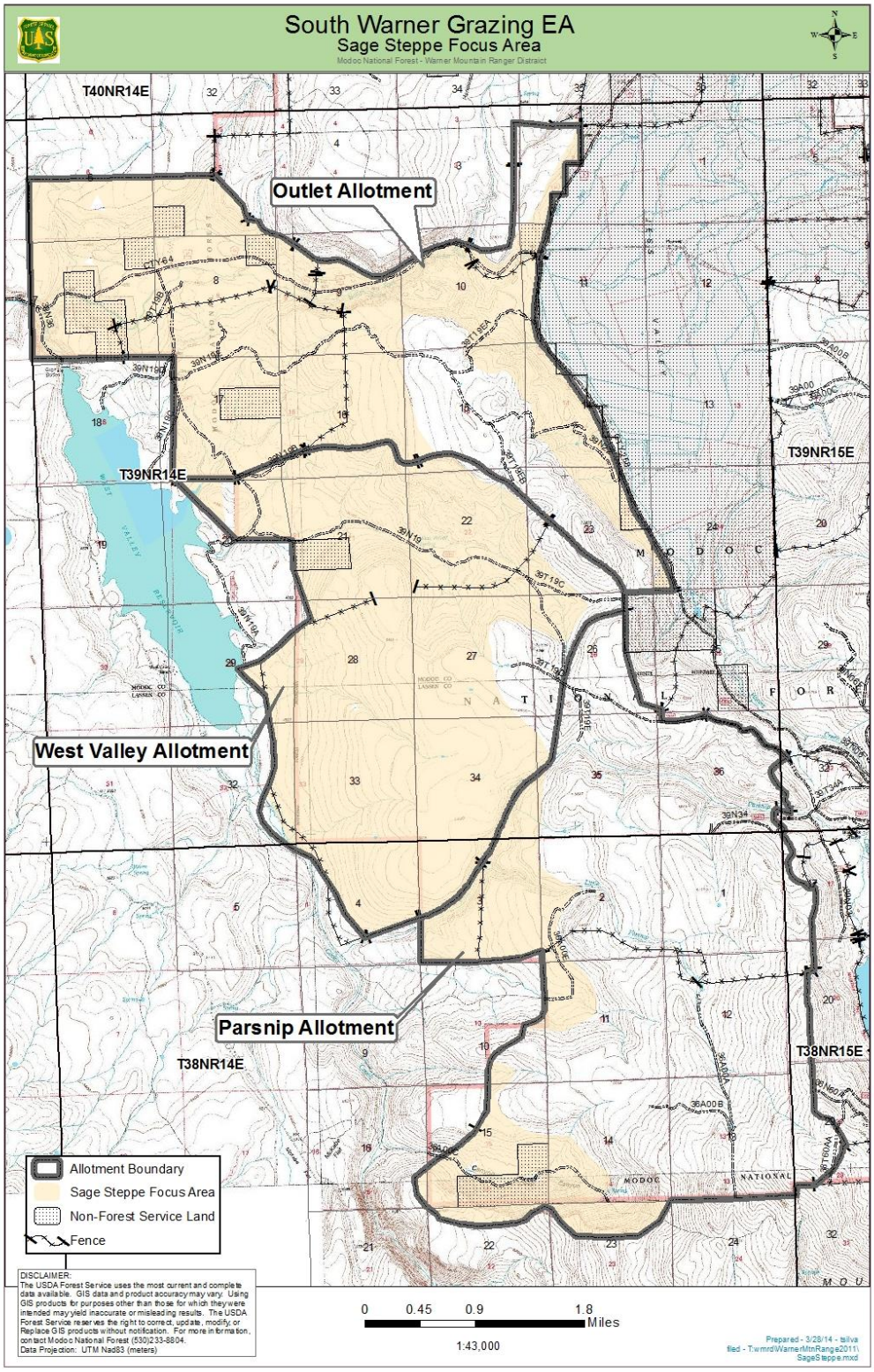


Figure 3: South Warner Sage Steppe Focus Area

The Sage Steppe Ecosystem Restoration Strategy objectives:

- "restore the sage steppe ecosystem and associated vegetative communities to desired habitat conditions reflecting ecological processes that existed pre-European settlement"
- "The purpose of this Restoration Strategy is to restore sage steppe ecosystems that have become dominated by Western juniper woodlands due to human causes."
- "More specifically the purpose of this Restoration Strategy is to restore sage steppe ecosystem processes and vegetation conditions that resemble historic mosaics, so that historic fire return intervals in sage steppe ecosystems can be sustained."

As per the 2008 SSERS old growth trees are defined as trees that were present at or before the mid-1800s (before European settlement). The old growth characteristics are defined as follows:

- Rounded top or unsymmetrical tops that may be sparse and contain limbs
- Deeply furrowed, fibrous bark on the trunk that is reddish in color
- Branches near the base of the tree that may be very large and covered with fruitcose lichens
- Limited terminal leader growth on branches in the upper 25 percent of the canopy

This Environmental Assessment (EA) is tiered to the Final Environmental Impact Statement (FEIS) for the Modoc National Forest LRMP, as amended. It also tiers to and incorporates by reference the Modoc National Forest LRMP, the Sierra Nevada Forest Plan Amendment, and the Sage Steppe Ecosystem Restoration Strategy. Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Warner Mountains District Office in Alturas, CA. The project record and all references cited are hereby incorporated by reference into this EA.

1.3.4 Noxious Weed Treatment Project (2008)

In August of 2008, the Forest Supervisor signed the Noxious Weed Treatment Project FEIS ROD. This EIS provided for the treatment of noxious weeds as they are discovered on the Forest.

Other

Refer to individual specialist reports for State and Federal laws, regulations and policies that guide individual resource analyses.

1.3.5 Modoc-Washoe Experimental Stewardship Program

Innovation and partnership in rangeland conservation have been the hallmarks of the Modoc-Washoe Experimental Stewardship Steering Committee in three decades of advising the Bureau of Land Management and Forest Service in northeast California and northwest Nevada. It encompasses more than two million acres of private and public lands in Modoc and Lassen Counties of California and Washoe and Humboldt Counties, Nevada. Established by Congress in the 1978 Public Rangeland Improvement Act, the Experimental Stewardship Program (ESP) was tasked with finding innovative solutions to rangeland management issues and providing incentives for rangeland improvements.

Keeping with the ESP model of balanced representation, the Modoc-Washoe group includes livestock grazing permit holders, environmental interest group representatives, wild horse and burro interests, resource conservation district interests, the academic sector, sporting interests, representatives for the timber and livestock industries, and local government representatives.

The ESP allows for several incentives for the Warner Mountain permittees such as:

- Technical Review Team (TRT) to help provide assistance in recommendations in land management practices
- Grazing Fee Credit – 50% Herding, monitoring
- Fee Credit for Range Improvements – up to 50%
- Post-Season Billing

1.3.6 Desired Conditions

Land and Resources Management Plan (LRMP) Objectives:

- Rangeland vegetation is managed to provide for healthy ecosystems and forage is made available for use by livestock, wild horses, and wildlife (LRMP 4-18).
- Management results in permitted livestock grazing in balance with forage capacity (LRMP 4-1) with sustained outputs of forage provided which contribute to the community economy (LRMP 4-2).
- Livestock are managed with a moderate investment in range improvement construction, allotment planning, permit administration and monitoring (LRMP 4-95).
- Vegetation diversity is provided to maintain a viable population and productive habitat for a variety of wildlife and fish species (LRMP 4-2).
- Habitat quality and quantity for Forest Management Indicator Species, especially threatened, endangered, and sensitive species is maintained or exceeded (LRMP 4-4).
- Habitat for sensitive plants is protected (LRMP 4-3).
- Fully develop and maintain suitable Forest wetlands (LRMP 4-4).
- Management maintains and enhances soil productivity (LRMP 4-2) and overall water quality is enhanced by applying Best Management Practices to meet State Water Quality Objectives and rehabilitating degraded watershed areas (LRMP 4-3).
- Restore sage steppe ecosystem processes and vegetation conditions (Sage Steppe FEIS page 7).

Standards and Guidelines:

- All livestock use will be in accordance with standards and guidelines for Upland, Riparian, Aspen, and Seep areas as directed by the LRMP, including Sage Steppe Ecosystem Restoration design standards. See attached Appendices D for applicable range standards.

Monitoring:

Annual monitoring will include Annual Operating Instruction compliance, range readiness, actual use, and livestock utilization and distribution.

- Methods include: allotment inspections, ocular estimates of utilization (browse and herbaceous), range readiness, stubble height, browsed plant method for aspen, and stream bank alteration. See attached Appendices for specific utilization standards.

Long term monitoring will include: range condition and trend studies.

- Methods include but are not limited to: cover micro plots, greenline, ocular macro plots, Proper Functioning Condition, vegetation frequency, and photo points.

Follow Best Management Practices Evaluation Protocol (BMPEP).

1.4 Purpose and Need for Action

The purpose of this analysis is to manage cattle grazing in a manner that meets or moves towards Desired Conditions (DCs) as defined on the previous page and in the Land and Resource Management Plan (LRMP) 1991 and is consistent with federal law and regulations.

The current allotment management plans (AMPs), for Outlet, West Valley and Parsnip Allotments were signed in 2002. There is a need to comply with the Recission Act of 1995 (Public Law 104-19, Section 504, which directs the Forest Service to complete National Environmental Policy Act (NEPA) analysis on all grazing allotments every 10 years. This analysis is needed to ensure that livestock grazing on the Outlet, West Valley and Parsnip allotments is consistent with current law, regulation, and management direction.

Reauthorization of grazing permits within the South Warner Allotments is needed because:

- Where consistent with other multiple use goals and objectives there is Congressional intent to allow grazing on suitable lands (Multiple Use-Sustained Yield Act of 1960, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976 and the National Forest Management Act of 1976) without impairment of the productivity, surface resources of the land. The Outlet, West Valley and Parsnip allotments contain lands identified as suitable for grazing consistent for domestic livestock grazing in the LRMP.
- It is Forest Service Policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans (36 CFR 222.2).
- By regulation, forage producing lands will be managed for livestock grazing where consistent with land management plans (FSM 2203.1).

Recent surveys of the analysis area have identified locations that are of concern, are currently in an unsatisfactory condition, or are not meeting or moving toward LRMP standards and guidelines or LRMP direction for these resources, especially in the South Fork Pit River, Unnamed Stream in West Valley Allotment, Little Parsnip Creek and a fen in the West Valley Allotment. Therefore, there is a need to analyze alternatives designed to maintain resource conditions currently meeting ecosystem goals and objectives and to improve conditions not meeting goals and objectives.

There is a need to improve these habitat conditions to move them toward Forest Plan standards.

- There is a need for livestock grazing on these allotments to meet multiple use objectives.
- There is a need to revise the South Warner allotments to incorporate current direction and suitable range conditions.
- There is a need to adjust the livestock numbers according to current measurements of forage production and monitoring data on the West Valley Allotment.
- There is a need to install a fence around the fen in the West Valley Allotment.
- There is a need to fell western juniper trees, which do not meet "old juniper" characteristics, on 88 acres of the S. Fork Pit River, 37 acres on the Unnamed Stream in the West Valley Allotment, and 157 acres on Little Parsnip Creek in order to create barriers to livestock trailing along stream banks and to reduce the impacts of juniper encroachment.
- There is a need to monitor two archaelogical sites to determine if cattle are adversely impacting the sites.
- There is a need to implement the Sage Steppe Ecosystem Restoration Strategy to restore habitat for sagebrush obligate species, improve hydrologic conditions and enhance the forage base for wildlife and domestic animals by felling western juniper, which does not meet "old juniper" characteristics, on 1364 acres on the West Valley Allotment.

1.5 Proposed Action

The section briefly summarizes the action proposed by the Forest Service to meet the purpose and need. It is described in detail in Chapter 2, in the Alternatives section of this document.

The proposed action would have three components which include grazing re-authorization and updating Allotment Management Plans (AMP), structural and non-structural improvements and adaptive management.

The Proposed Action will continue grazing on all three allotments under a strategy designed to move the existing conditions toward desired conditions. Current permitted numbers and season of use would continue on the Outlet and Parsnip allotments but would be reduced on the West Valley Allotment. Several structural and non-structural improvements would be implemented. If monitoring determines that the allotments are not moving towards meeting the LRMP after implementation than adaptive management strategies including the possibility of fences will be implemented.

1.6 Decision Framework

The District Ranger will decide, based on information provided in this Environmental Assessment (EA) and the Project Record, whether to continue livestock grazing on the allotment; and if so, under what conditions. The decision will also include a determination of consistency with the Forest Plan, NFMA, NEPA, and applicable laws, regulations, and executive orders.

Given the purpose and need, the District Ranger will review the five Alternatives in order to make the following decisions:

Whether or not to continue to authorize commercial livestock grazing in the three Allotments (Alternative 1 v.s. Alternatives 2, 3, 4, and 5).

If a decision is made to continue to authorize livestock grazing, the District Ranger will decide whether to implement the grazing strategy as proposed, implement the Sage Steppe Strategy to reduce juniper, and reduce numbers on West Valley (Proposed Action, Alternative 2). Whether to implement the grazing strategy as proposed, implement the Sage Steppe Strategy, but not reduce numbers on West Valley (Alternative 3). Whether to implement the grazing strategy as proposed, not implement the Sage Steppe Strategy, and reduce numbers on West Valley (Proposed Action, Alternative 4). Lastly, to implement grazing strategy as proposed, implement Sage Steppe Strategy, and reduce numbers on West Valley from the permitted numbers (Alternative 5). (Table).

Mgmt. component	Alt. 1 (no action)	Alt.2 (proposed action)	Alt. 3	Alt. 4	Alt. 5
Grazing	No	Yes	Yes	Yes	Yes
Sage Steppe Juniper Treatment	No	Yes	Yes	No	Yes
Reduce numbers on West Valley	N/A	Yes	No	Yes	Yes

Table 4: Alternative Management Component Comparison.

In addition to this decision, the District Ranger will make a finding on the significance of the environmental effects anticipated from implementation of the selected action and whether an environmental impact statement (EIS) will need to be prepared.

1.7 Public Involvement

The proposal was listed in the Schedule of Proposed Actions (SOPA) on 9/27/2011. The proposal was provided to the public and other agencies for comment during scoping on 12/7/2012. The project was presented to the quarterly meeting of the Pit River Tribe in December, 2012. Issues are points of concern about environmental effects that may occur as a result of implementing the proposed action. Some are generated by the public and are in response to the proposed action.

Issues identified during scoping are normally addressed by project design, mitigation measures and developing alternatives to the proposed action. This project requires the development of alternatives which address a "no action" and an action alternative which address resource concerns. Concerns which directed the formation of alternatives included the need to reduce effects to riparian areas; livestock use levels, and restore hydrological function to a fen. The project interdisciplinary team developed two more action alternatives (Alternative 3, & 4) to respond to issues brought forward by the permittee during collaboration and scoping and the County. Scoping responses are included in Appendix B.

The first Environmental Assessment (EA) was released for comment in August 2013. The legal notice was published in the Modoc Record on August 22, 2013. During this period, comments were received from individuals, permittees and industrial interests group. After the first round of comments was received, the district decided to revise the EA. An additional Alternative 5 was

developed from comments received during the comment period. In April 2014, the revised EA is released for comment.

1.8 Issues

The following issues were identified during external scoping:

Issue 1: The need to implement the Sage Steppe Restoration Strategy.

Issue 2: The relationship between cattle grazing and the risk of high intensity fire.

Issue 3: The selection of an alternative that provides the most economic benefit.

Issue 4: The decrease of AUM's now will make it difficult to raise them again in the future even if conditions improve.

Issue 5: Barriers creation along some portions of Little Parsnip Creek will restrict movement through the canyon.

Issue 6: Conditions within the Fen have improved over the past 15 years without a fence.

The following issues were identified during internal scoping by the Interdisciplinary Team:

Issue 1: Reach 313 of S. Fork of Pit River is functioning at risk with a downward trend.

> Objective: Fell juniper in the riparian area to provide a barrier to livestock. This will allow the riparian area to progress towards a satisfactory ecological condition.

Issue 2: Reach 331 of Little Parsnip Creek is functioning at risk.

> Objective: Fell juniper in the riparian area to provide a barrier to livestock. This will allow the riparian area to progress towards a satisfactory ecological condition.

Issue 3: Fen on West Valley Allotment is being degraded by trampling from cattle.

> Objective: Eliminate grazing and trampling in fen. Restore to proper hydrological function.

Issue 4: Concerns over Juniper expansion in uplands and riparian areas.

> Objective: Reduce/remove Western juniper in riparian and upland areas to increase range forage quality.

Issue 5: Concerns that the West Valley Allotment does not produce enough range forage to sustain the permitted numbers.

> Objective: Reduce West Valley Allotment permitted livestock numbers.

These issues identified internal and external are discussed throughout the EA.

CHAPTER 2: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter explains in detail each alternative being considered. This chapter is intended to provide the decision-maker the basis for choice. The proposed action was developed by the Interdisciplinary Team (IDT) based on resource concerns and direction in the Forest Plan. This chapter includes mitigation, and monitoring.

2.1.1 Alternatives Considered but Eliminated

Continuing with current allotment management plan was considered but eliminated from detailed analysis because it would not meet the purpose and need or LRMP standards and guidelines as described in Chapter 1 for the reasons described below:

- Reach 313 and Reach 331 are both functioning at risk which are not meeting LRMP standard and guidelines.
- A fen that was discovered in the West Valley Allotment has signs of trampling from cattle.
- Forage production is meeting current use not permitted use on the West Valley Allotment.

2.2 Alternatives Considered in Detail

This EA assesses the potential effects of five alternatives: a no action alternative and four action alternatives.

The Head Months proposed in all alternatives considered in detail were established as a maximum limit. Exercising administrative options allow flexibility for periodic adjustments in livestock numbers, grazing season, and grazing system to achieve desired conditions.

2.2.1 Alternative 1 – No Grazing (No Action) (See Appendix G for Map)

No Grazing is synonymous with No Action and means that livestock grazing would not be authorized within the project area. Livestock grazing permits would be cancelled in accordance with agency regulations (36 CFR 222.4) and grazing would cease two years after notice of cancellation (FSH 2209.13, 16.24). Allotment management would not change during this two year period from the current management.

All structural range improvements currently in place for control or management of livestock would be removed such as fences and water developments. Allotment exterior boundary fences would be assigned to adjacent permittees for continued maintenance. Other agency managed lands and Private land boundary fences would remain intact with ownership assumed to belong to the respective landowners.

The purpose of the No Grazing alternative is to describe the resource effects of cancellation of grazing permits, with no livestock grazing taking place. Other management activities taking place in the area would continue if this alternative is selected. Activities such as timber

management, road maintenance, recreation, noxious weed management and fire protection would continue as they currently take place in the analysis area.

2.2.2 Actions Common to Alternatives 2, 3, 4, & 5

Administrative Actions and Other Requirements
Grazing numbers would be based on Head Months. Permits would be based on Average Animal Use and Cow/Calf Pairs.

The action alternatives establish a maximum limit for Head Months for each allotment. Alternatives propose livestock numbers (an average number of livestock) and the average season of use. Flexibility is maintained for annual adjustment of both numbers and/or season as long as the permitted use level (Head Months) is not exceeded. On an annual basis the actual livestock numbers and period of use may be adjusted in response to discussions with resource specialists and in response to resource needs, range readiness and monitoring results. The grazing season beginning and ending dates could be varied as much as two weeks from the average season of use allowing flexibility for differences in annual range readiness. Flexibility that allows for annual adjustments provides a management tool to assure that riparian and rangeland objectives are met.

Changes to numbers and season of use would be displayed in the Annual Operating Instructions (AOI). The permit would display the "average" number of livestock for the "average" season of use (Grazing Permit Administration Handbook 2209.13, Section 15.43; these dates and numbers may vary year by year in AOIs but when combined, would be equal to or less than the maximum permitted Head Months.

Permittees are required to perform all annual maintenance of range improvements (i.e. fences and water developments) assigned in their permits. Permittees will be authorized to graze on lower elevations if maintenance has been completed prior to turnout. As weather is permitted, higher elevation range improvements will be completed prior to moving to these areas. Current ATV/UTV use, as permitted by current regulation and direction, by the permittees and their agents would be maintained, as needed, for management of improvements.

Appropriate administrative actions (see Table 5, Administrative Adaptive Management Actions for Alternatives 2, 3, 4, and 5 below, for examples) would be taken when the permittees management is not in compliance with the annual operating instructions (AOI). Consequences would occur (as described in FSH 2209.13, Section 16.21). Under the Terms and Conditions of the Forest Service Term Grazing Permit (Part 2, number 8(b) and Part 3) the Forest Officer in charge may modify the permitted number to protect resources. This is consistent with Forest Service Manual (FSM 2200).

Short term administrative actions used to manage annual use within the defined limits of the authorization can be implemented without additional NEPA (FSH 2209.13 Section 92.23b.)

If monitoring indicates that changes are needed, other adaptive management strategies to achieve the objectives of the proposed action could include actions described in Table 5, Administrative Adaptive Management Actions for Alternatives 2, 3, 4, and 5 below.

Table 5. Administrative Adaptive Management Actions for Alternatives 2, 3, 4, and 5

Livestock Grazing Management Actions[1]	Short Term/Administra-tive Actions/ Annual Use[2]	Long Term/Allotment Management Actions[2]	Actions Permittee can Utilize but the FS Can Not Mandate
Use of salt or supplements to draw livestock toward or away from specific areas			X
Using riders/herders to minimize cattle use in problem areas.			X
Change season of use, not to exceed dates listed in the proposed action	X	X	
Change animal numbers, not to exceed AUMs listed in the proposed action	X	X	
Change animal class. This refers to the type of animals (Ex yearling, c/c pair bulls, etc., not sheep versus cattle).	X		
Change number of days of livestock utilization. This is sometimes referred to as duration.	X		
Change the grazing system	X	X	
Rest from livestock grazing for one or more years	X		
Alteration of trailing routes timing and location	X		
Existing water developments may be improved if not functioning properly by moving the trough, resetting the spring box, expanding fence to capture spring source and protect the source, hardening the water overflow with rock & gravel, burying pipeline, returning excess water flow to the stream channel, etc.	X	X	

[1] *The potential management actions are designed to be used either alone or in combination to best meet, or at least, move toward the desired resource condition within a timeframe of ten years. All actions are consistent with Forest Plan and other relevant decision documents (Biological Opinion, etc.)*

Livestock Grazing Management Actions[1]	Short Term/Administra-tive Actions/ Annual Use[2]	Long Term/Allotment Management Actions[2]	Actions Permittee can Utilize but the FS Can Not Mandate

[2] *These actions do not require NEPA decision and can be implemented through permit administration*

See Monitoring Section below, for the complete monitoring plan. Key to the implementation strategy is to allow adequate time during implementation to first, complete the proposed improvements, second, monitor conditions and third, if needed, allow appropriate permit administration to occur before any subsequent stages would be initiated. The proposed, staged implementation process is described below.

Implementation Process:
Stage 1, All Allotments
Outlet, West Valley, & Parsnip

Structural and Non-Structural Improvements

The proposed structural and non-structural improvements would be used to help improve management and incorporate current direction to improve range conditions in several areas. There is the need to revitalize sage-steppe ecosystems through juniper control and reduce grazing impacts on riparian areas that are functioning at risk. Site specific proposals are the following:

Outlet C&H Allotment:

- Fell western juniper trees, which do not meet "old juniper" characteristics, on 88 acres of the S. Fork Pit River in order to create barriers to livestock trailing along stream banks and to reduce the impacts of juniper encroachment.
- Archaeological site will be monitored to determine if cattle are adversely impacting the site.

West Valley C&H Allotment:

1. Install a fence around a fen located at T.39N, R14E, Sec. 20 to protect proper hydrological function and fen vegetation.
2. Fell western juniper trees, which do not meet "old juniper" characteristics, on 37 acres of an unnamed stream in order to create barriers to livestock trailing along stream banks and to reduce the impacts of juniper encroachment.

Parsnip C&H Allotment:

1. Fell western juniper trees, which do not meet "old-juniper characteristics, on 157 acres of Little Parsnip Creek in order to create barriers to livestock trailing along stream banks and to reduce the impacts of juniper encroachment.

2. Archaeological site will be monitored to determine if cattle are adversely impacting the site.

In addition, to move towards the desired condition for the riparian reaches that are functioning at risk, more appropriate utilization standards will be implemented. These trigger points for riparian utilization as described below help to identify when a specific threshold is about to be reached and changes need to be made (generally moving cattle to another pasture or coming off the allotment).

The specific trigger points for Riparian Utilization are:

- 30% utilization on Herbaceous vegetation
- 20% Streambank Alteration
- 20% utilization on Woody Herbaceous
- Stubble Height of 5"

After implementation, key areas in the riparian sections will be monitored and if the riparian utilization standards are exceeded three years in a row during normal precipitation years than the next step will be to fence those sections that are not moving towards desired conditions. The riparian sections can be found in the adaptive management strategies in detail.

Adaptive Management Strategies

Stage 2, Outlet, West Valley & Parsnip Allotments

If monitoring of management strategies described in Stage 1, to eliminate or reduce livestock impacts to streams functioning at risk, indicates that the health and functions of the riparian resources are degrading as a result of livestock use or resources are not moving towards meeting Forest Plan Standards and Desired Future Conditions in either of the three riparian areas, then the following adaptive management action would be implemented. The riparian areas have been separated into sections which can be managed by pastures on the allotments. This is not the order that the fences will be implemented but to identify the sections that will be monitored. See Appendix C for map.

Outlet Allotment:

- Construct exclosure fence #1, approximately 0.66 miles within T.39N, R14E, Sec. 7.
- Construct exclosure fence #2 approximately 3.70 miles within T.39N, R14E, Sec. 8 & 9.
- Construct exclosure fence #3 approximately 1.24 miles within T.39N, R14E, Sec. 9 & 10.
- Construct exclosure fence #4 approximately 1.42 miles within T.39N, R14E, Sec. 10 & 11.

West Valley Allotment:

- Construct exclosure fence #5 approximately 3.14 miles within T.39N, R14E, Sec. 20, 21 & 22.

Parsnip Allotment:

- Construct exclosure fence #6 approximately 4.12 miles within T.40N, R14E, Sec. 1,2 & 3.
- Construct exclosure fence #7 approximately 0.60 miles within T.40N, R14E, Sec. 3 & 12.
- Construct exclosure fence #8 approximately 1.92 miles within T.40N, R14E, Sec. 12 & 13.

Also, if monitoring indicates that livestock are adversely impacting the archaeological values of two sites, then the following adaptive management action would be implemented.

- An exclosure fence would be constructed in the Outlet or Parsnip Allotment around two archaeological sites if it is found that cattle adversely impacting the historic value of the sites.

2.2.3 Alternative 2 – Proposed Action (See Appendix G for Map)

The proposed action has been developed to meet the project's purpose and need. The proposed action will have three components which include grazing re-authorization and updating allotment management plans (AMP), structural and non-structural improvements, and adaptive management strategies.

This Alternative is to implement the sage steppe restoration strategy which would restore habitat for sagebrush obligate species, improve hydrologic conditions and enhance the forage base for wildlife and domestic animals. This action is needed because of the loss of the sagebrush ecosystem across the West Valley Allotment as the density of juniper has altered many sites from sagebrush steppe to juniper woodlands dominated. The cause of this ecological shift is predominately due to anthropogenic changes, and the associated loss of vegetative, habitat, and hydrologic values. The primary method for restoration will be chainsaw felling of juniper, piling, and pile burning. This restoration would increase the area of sagebrush and grassland dominated sage steppe habitat over time thereby improving the forage base for wildlife and livestock.

West Valley C&H Allotment:

1. Western juniper that does not meet "old juniper" characteristics would be either be felled, lopped, as scatter or felled, piled, and burned on 1,364 acres on the West Valley allotment. Characteristics of "old juniper" are described in the Sage Steppe Ecosystem Restoration Strategy EIS (R5-MB-161, April 2008).

After implementing the juniper treatment, the area will be rested for two growing season per the Sage Steppe Restoration strategy. Monitoring and evaluation of the treated area will occur before livestock grazing will resume.

Based on analysis of monitoring data, utilization data and actual use reports collected by Modoc National Forest resource specialists, the Forest proposes to re-authorize livestock grazing within the three allotments as described in the table below (Table 6: Permitted use under Proposed Action).

Allotment	Season of Use	Permitted Head Months (HM) & Animal Unit Months (AUMs)	Proposed Head Months (HM) & Animal Unit Months (AUMs)
Outlet	**5/1-6/30**	**347 HM/458 AUMs**	**Same as Permitted**
Outlet	**5/15-6/30**	**85 HM/112 AUMs**	**Same as Permitted**
West Valley	**5/1-6/30**	**632 HM/834 AUMs**	**281 HM/371 AUMs**
Parsnip	**7/1-9/30**	**151 HM/199 AUMs**	**Same as Permitted**
Parsnip (Special Unit)	**5/1-9/30**	**75 HM/99 AUMs**	**Same as Permitted**

Table 6: Permitted use under Proposed Action

On both the Outlet C&H and Parsnip C&H Allotments the current permitted numbers would remain the same but on the West Valley C&H Allotment the permitted numbers would be reduced to reflect actual numbers that have grazed on the allotment for the last 18 years.

The maximum allowable upland utilization standards will not change due to the fact the uplands are in satisfactory condition in all three allotments. The utilization standards are as follows:

Herbaceous utilization: 50%
Browse Utilization: 20%

To move towards desired conditions on the riparian reaches that are functioning at risk, more appropriate standards will be implemented until they meet standards. Those standards can be found in the previous implementation process section.

2.2.4 Alternative 3 – Implement Sage Steppe Restoration Strategy & Keep All Permitted Head Months (See Appendix G for Map)

This Alternative is the same as Alternative 2 (proposed action) except it relies on implementing the sage steppe restoration strategy in order to keep all current permitted livestock numbers on all three allotments. After implementing the juniper treatment, the area will be rested for two growing season per the Sage Steppe Restoration strategy. Monitoring and evaluation of the

treated area will occur before livestock grazing will resume. The full permitted livestock numbers in the West Valley Allotment would be reauthorized. These numbers are displayed in a table below (Table 7: Permitted use, Alternative 3):

Allotment	Season of Use	Permitted Head Months (HM) & Animal Unit Months (AUMs)
Outlet	**5/1-6/30**	**347 HM/458 AUMs**
Outlet	**5/15-6/30**	**85 HM/112 AUMs**
West Valley	**5/1-6/30**	**632 HM/834 AUMs**
Parsnip	**7/1-9/30**	**151 HM/199 AUMs**
Parsnip (Special Unit)	**5/1-9/30**	**75 HM/99 AUMs**

Table 7: Permitted use, Alternative 3

The allowable upland utilization standards will remain the same as stated in Alternative 2, 4, and 5.

Although, to meet Desired Conditions on the riparian reaches that are functioning at risk, more restrictive utilization standards would be implemented until those standards are met. Those standards can be found in the previous implementation process section. This is the same for Alternative 2, 4, and 5.

2.2.5 Alternative 4 – No Sage Steppe Restoration Strategy & Reduce West Valley Permitted Head Months (See Appendix G for Map)

This alternative was developed to not implement the sage steppe restoration strategy which would allow continued juniper encroachment. As the juniper increases, it has been found to be associated with the decrease in ground cover consisting of shrubs, grasses and forbs. This affects the forage available for livestock and has the potential to reduce livestock and wildlife and it has the potential to reduce permitted livestock numbers on the West Valley allotment. The proposal to reduce livestock number is in response to juniper encroachment. The table below (Table 8: Reduction in permitted use to West Valley Allotment, Alternative 4) shows the proposed reduction:

Allotment	Season of Use	Permitted Head Months (HM) & Animal Unit Months (AUMs)	Proposed Head Months (HM) & Animal Unit Months (AUMs)
Outlet	**5/1-6/30**	**347 HM/458 AUMs**	**Same as Permitted**
Outlet	**5/15-6/30**	**85 HM/112 AUMs**	**Same as Permitted**

West Valley	**5/1-6/30**	**632 HM/834 AUMs**	**281 HM/371 AUMs**
Parsnip	**7/1-9/30**	**151 HM/199 AUMs**	**Same as Permitted**
Parsnip (Special Unit)	**5/1-9/30**	**75 HM/99 AUMs**	**Same as Permitted**

Table 8: Reduction in permitted use to West Valley Allotment, Alternative 4

The allowable upland utilization standards will remain the same as stated in Alternative 2, 3, and 5.

Although, to meet Desired Conditions on the riparian reaches that are functioning at risk, more restrictive utilization standards would be implemented until those standards are met. Those standards can be found in the previous implementation process section. This is the same for Alternative 2, 3, and 5.

2.2.6 Alternative 5 – Implement Sage Steppe Restoration Strategy & propose 506 Head Months on West Valley Allotment (See Appendix G for Map)

This Alternative is similar to Alternative 2 and 3 except the maximum permitted numbers would be 506 Head Months on the West Valley Allotment. After implementing the juniper treatment, the area will be rested for two growing season per the Sage Steppe Restoration strategy. Monitoring and evaluation of the treated area will occur before livestock grazing will resume. The Head Months for this alternative are based on data from the dominant vegetation layer in GIS for the West Valley Allotment. The vegetation layer provides an average forage production for the various vegetation types. See Table 9. The permittee will be allowed to run full permitted numbers but once season of use or allowable utilization standards are met cattle will have to be removed from the allotment.

Allotment	Season of Use	Permitted Head Months (HM) & Animal Unit Months (AUMs)	Proposed Head Months (HM) & Animal Unit Months (AUMs)
Outlet	**5/1-6/30**	**347 HM/458 AUMs**	**Same as Permitted**
Outlet	**5/15-6/30**	**85 HM/112 AUMs**	**Same as Permitted**
West Valley	**5/1-6/30**	**632 HM/834 AUMs**	**506 HM/670 AUMs**
Parsnip	**7/1-9/30**	**151 HM/199 AUMs**	**Same as Permitted**
Parsnip	**5/1-9/30**	**75 HM/99 AUMs**	**Same as Permitted**

Table 9: Proposed Permitted Use, Alternative 5

The allowable upland utilization standards will remain the same as stated in Alternative 2, 3 and 4.

Although, to meet Desired Conditions on the riparian reaches that are functioning at risk, more appropriate utilization standards would be implemented until those standards are met. Those standards can be found in the previous implementation process section. This is the same for Alternative 2, 3, and 5.

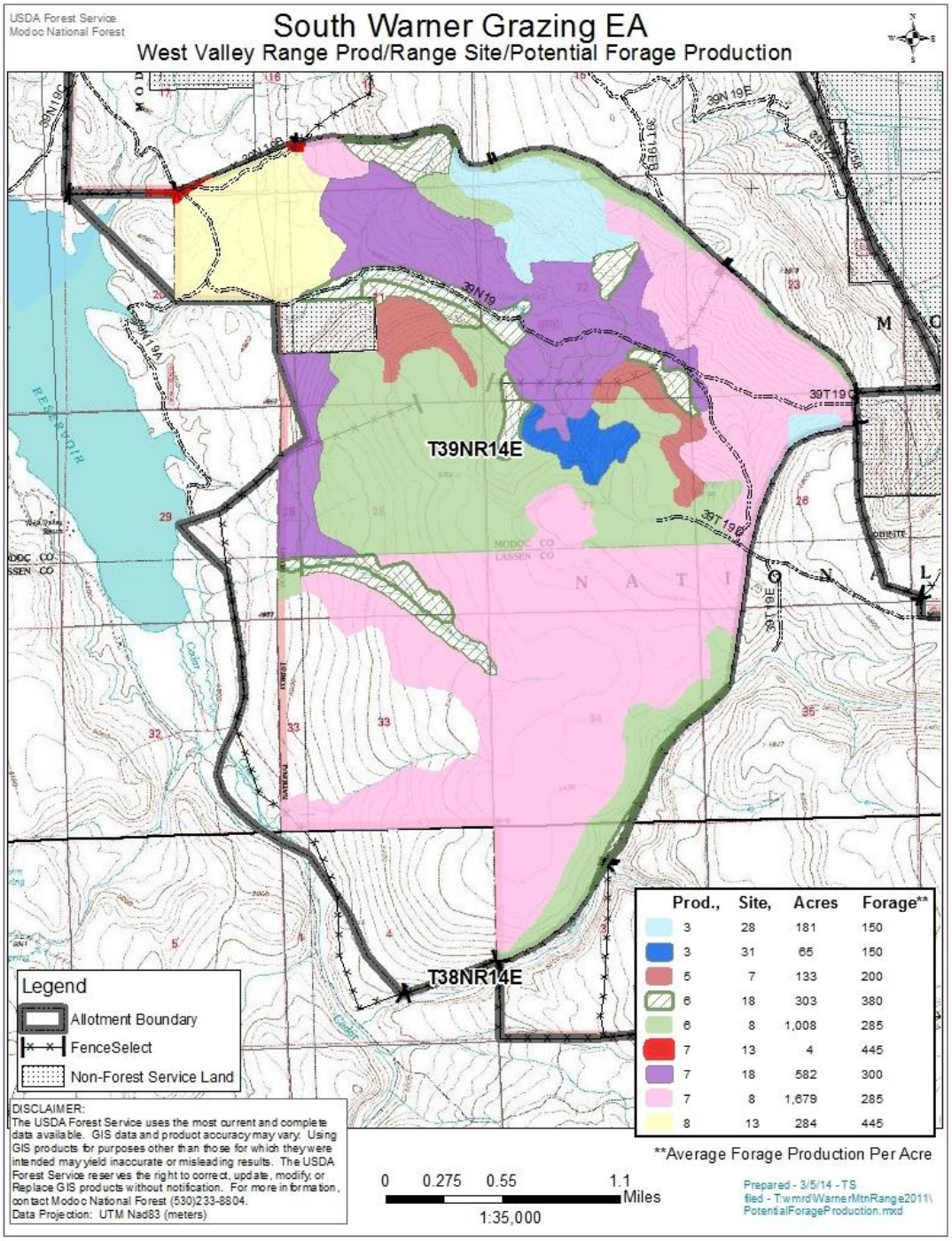


Figure 4: South Warner Alternative 5, West Valley Potential Forage Production

2.3 Summary of Alternatives

Table 10, Summary of Alternatives, below, provides a quick summary of some of the key points about each alternative.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Grazing	Grazing would continue for up to 2 years following the decision. After that, no grazing would be allowed without a new NEPA decision.	On annual basis range management strategies, such as livestock numbers and period of use may be used in response to resource needs, range readiness, and monitoring. The Head Months numbers in Table: 6 for each allotment is the maximum use limit.	On annual basis range management strategies, such as livestock numbers and period of use may be used in response to resource needs, range readiness, and monitoring. The Head Months numbers in Table: 7 for each allotment is the maximum use limit.	On annual basis range management strategies, such as livestock numbers and period of use may be used in response to resource needs, range readiness, and monitoring. The Head Months numbers in Table: 8 for each allotment is the maximum use limit.	On annual basis range management strategies, such as livestock numbers and period of use may be used in response to resource needs, range readiness, and monitoring. The Head Months numbers in Table: 9 for each allotment is the maximum use limit.
Total Livestock numbers & Grazing (all three allotments)	0 HMs 0 AUMs	939 HMs 1239 AUMs	1290 HMs 1702 AUMs	939 HMs 1239 AUMs	1164 HMs 1538 AUMs
Time Frame	Grazing would continue for up to 2 years following the decision. After that, no grazing would be allowed without a new NEPA decision.	The proposed action is designed to allow improvements & structures to be constructed and evaluated for effectiveness. Rest Juniper treatment area 2 growing seasons after treatment. Reduce West Valley permitted numbers. Monitoring would determine the need of adaptive management. Expect time frame is less than 10 years.	This alternative is designed to allow improvements & structures to be constructed and evaluated for effectiveness. Rest Juniper treatment area 2 growing seasons after treatment. Implement full permitted numbers on all allotments. Monitoring would determine the need of adaptive management. Expect time frame is less than 10 years.	This alternative is designed to allow improvements & structures to be constructed and evaluated for effectiveness. Monitoring would determine the need of adaptive management. Reduce West Valley permitted numbers. Expect time frame is less than 10 years.	This alternative is designed to allow improvements & structures to be constructed and evaluated for effectiveness. Rest Juniper treatment area 2 growing seasons after treatment. Reduce West Valley permitted numbers. Monitoring would determine the need of adaptive management. Expect time frame is less than 10 years.
Improvements & Structures	All current infrastructures would be removed, except for allotment	Fell juniper on 3 riparian areas to create livestock barriers: Outlet: 88 acres	Fell juniper on 3 riparian areas to create livestock barriers: Outlet: 88 acres	Fell juniper on 3 riparian areas to create livestock barriers: Outlet: 88 acres	Fell juniper on 3 riparian areas to create livestock barriers: Outlet: 88 acres

	boundary fences that adjoin other allotments outside the analysis area. Maintenance of these allotment boundary fences would be assigned to adjacent permitees.	South Fork Pit River West Valley: 37 acres Unnamed Reach Parsnip: 157 acres Little Parsnip Creek Install fence around fen on West Valley Allotment Monitor two archaeological sites in Outlet and Parsnip West Valley: fell, lop, scatter & pile burn juniper on 1364 acres in the north unit	South Fork Pit River West Valley: 37 acres Unnamed Reach Parsnip: 157 acres Little Parsnip Creek Install fence around fen on West Valley Allotment Monitor two archaeological sites in Outlet and Parsnip West Valley: fell, lop, scatter & pile burn juniper on 1364 acres in the north unit	South Fork Pit River West Valley: 37 acres Unnamed Reach Parsnip: 157 acres Little Parsnip Creek Install fence around fen on West Valley Allotment Monitor two archaeological sites in Outlet and Parsnip	South Fork Pit River West Valley: 37 acres Unnamed Reach Parsnip: 157 acres Little Parsnip Creek Install fence around fen on West Valley Allotment Monitor two archaeological sites in Outlet and Parsnip West Valley: fell, lop, scatter & pile burn juniper on 1364 acres in the north unit
Adaptive Management		Monitor the riparian areas after implementation: if they exceed utilizations 3 years in a row then fences will be constructed in those sections failing. Outlet Sections: #1-0.66 miles #2-3.70 miles #3-1.24 miles #4-1.42 miles West Valley Section: #5-3.14 miles Parsnip Sections: #6-4.12 miles #7-0.60 miles #8-1.92 miles After monitoring for three years if livestock are impacting archaeological sites than fence exclosures will be constructed-Outlet & Parsnip	Monitor the riparian areas after implementation: if they exceed utilizations 3 years in a row then fences will be constructed in those sections failing. Outlet Sections: #1-0.66 miles #2-3.70 miles #3-1.24 miles #4-1.42 miles West Valley Section: #5-3.14 miles Parsnip Sections: #6-4.12 miles #7-0.60 miles #8-1.92 miles After monitoring for three years if livestock are impacting archaeological sites than fence exclosures will be constructed-Outlet & Parsnip	Monitor the riparian areas after implementation: if they exceed utilizations 3 years in a row then fences will be constructed in those sections failing. Outlet Sections: #1-0.66 miles #2-3.70 miles #3-1.24 miles #4-1.42 miles West Valley Section: #5-3.14 miles Parsnip Sections: #6-4.12 miles #7-0.60 miles #8-1.92 miles After monitoring for three years if livestock are impacting archaeological sites than fence exclosures will be constructed-Outlet & Parsnip	Monitor the riparian areas after implementation: if they exceed utilizations 3 years in a row then fences will be constructed in those sections failing. Outlet Sections: #1-0.66 miles #2-3.70 miles #3-1.24 miles #4-1.42 miles West Valley Section: #5-3.14 miles Parsnip Sections: #6-4.12 miles #7-0.60 miles #8-1.92 miles After monitoring for three years if livestock are impacting archaeological sites than fence exclosures will be constructed-Outlet & Parsnip

2.4 Mitigation Measures, Management Requirements, and Best Management Practices

The National Environmental Policy Act defines "mitigation" as avoiding, minimizing, rectifying, reducing, eliminating or compensating for project impacts.

Mitigation measures are important mechanisms used by the specialist to minimize the potential adverse environmental impacts associated with the proposed actions. For the South Warner analysis, mitigation measures are included in the design of this project and are integral components of the proposed action and Alternative 3, 4 & 5. For example, alternative design features such as the juniper barrier is designed to avoid adverse impacts to streams and riparian areas. Additional mitigation measures have been developed to minimize, reduce or avoid any potential adverse impacts to other resources such as reducing the risk of noxious weed establishment.

Many mitigation measures are considered to be Best Management Practices (BMPs) for watershed, and vegetation management and General Water Quality Management. Best Management Practices are "practices or combinations of practices that are determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation, to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing impacts to water quality and other resources.

See Term Grazing Permits, in District files, for terms and conditions associated with livestock administration on the South Warner allotments.

In addition to BMPs, included in the project design are Management Areas which are standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water diversity, to be met in accomplishing National Forest System goals and objectives.

All effects analyses in Chapter 3 of this Environmental Analysis are based upon the implementation of the project mitigation measures, Management Direction and BMPs. Table 11 below describes the mitigation measures developed specifically for issues relating to this project.

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
Aquatics			
Refer to Riparian Matrix (Appendix D)			Aquatics Specialist, Rangeland Management Specialist Technicians, &, other Forest Service personnel
Botany			
Forbid vehicles or other heavy mechanical equipment from entering identified sensitive plant sites.	Prevent direct impacts to sensitive plant species; prevent indirect impacts to habitat such as altered soil structure.	*Astragalus pulsiferae* var. *coronensis* grows in uncommon, friable, gravelly or sandy shallow soils, which are susceptible to compaction and pulverization by heavy vehicles and tires.	- Botanist - Treatment Crew
Remove juniper treatment slash from sensitive plant sites; forbid piling or burning slash within sensitive plant sites	Prevent indirect impacts due to high fuel loading on sensitive plant sites.	Burn piles on similar shallow, sandy soil habitats elsewhere on the Forest show that high-intensity fire alters the habitat in	- Botanist - Treatment Crew

		favor of more common early-seral species. Along with the juniper treatments themselves, debris clean-up is a logical safeguard against potential fire impacts.	
Ensure weed-free cleanliness of workers or equipment before entering sensitive plant sites.	Prevent indirect impacts due to competition from introduced invasive weeds.	Invasive weeds such as Medusahead have invaded and degraded other sites of this species.	-Treatment Crew
Monitoring of sensitive plant sites for five years; establish baseline before commencement of treatment activities;	Adaptive management of sensitive plant site.	While junipers compete with the sensitive plant species, other understory species currently suppressed by juniper may increase and compete following juniper treatment. Monitoring data will help guide future conservation actions to promote this species.	-Botanist
Fuels			
Hazardous Fuels- Some areas will be evaluated after project implementation and can be identified for piling and burning if excessive fuels exist.	Reduce potential hazardous fuel loading and prevent resource damage in the event of wildfire.	Fuel Specialist will evaluate after juniper thinning operations and determine if piling and burning will be necessary	- Fuels Specialist - Treatment Crew
Smoke- Burning of Piles. Burning will be conducted on permissive burn days for the Northeast Air Plateau. Burn Day designations are determined by the California Air Resource Board CARB	Reduce health impacts on human beings and maintain national visibility standards for class I airsheds	Burn only on days designated with good smoke dispersion to prevent human health impacts and maintain good visibility.	Burn Crew
Heritage			
Three monitoring photo points placed in each site (2) exhibiting negative affects potentially caused by livestock.	To document the nature and cause of the affects.	MODERATE: This type of monitoring has not been undertaken before.	Heritage Resource Program Staff.
Hydrology (see prescribed BMPs for more information)			
Install Juniper Barriers along SF Pit River, Parsnip Creek, and Unnamed Tributary to Parsnip Creek; if juniper barriers are not successful at improving riparian conditions a fence would be installed and maintained at these locations.	Water Quality Compliance: BMPs 8.2 and 8.3	Moderate to High: Experience	Rangeland Management Specialist & Technicians, Hydrologist, other Forest Service personnel
Install and maintain fence around unnamed fen within the West Valley Allotment.	Water Quality Compliance: BMPs 8.2 and 8.3	High: Experience	Rangeland Management Specialist & Technicians, Hydrologist, other Forest Service personnel
Maintain existing fences around West Valley Spring, the unnamed spring in the west valley allotment, and the unnamed spring in the Parsnip allotment that are already fenced.	Water Quality Compliance: BMPs 8.2 and 8.3	High: Experience	Rangeland Management Specialist & Technicians, Hydrologist, other Forest Service personnel
Noxious Weeds			
Juniper treatments will occur as early in the year as possible, to avoid spreading Medusahead. Treatments will not occur after Medusahead begins to cure, about mid-July.	Prevent further spread of Medusahead in freshly treated juniper stands.	Medusahead reproduces by seed alone. Medusahead seed is best spread by animal and human vectors. Treatments conducted before Medusahead seed set will greatly reduce the chance of spreading seeds.	- Treatment Crew.
Weed sites CEDI391409C, ONAC391422J, and SAAE391409D will be manually treated prior to juniper treatments,	Prevent these weed sites from further establishing themselves in the disturbance following juniper treatment.	Treating known weed sites will prevent them from serving as a seed source while vegetation reclaims thinly vegetated soil,	- Botany crew.

and monitored and if necessary retreated the spring following the completion of implementation.		caused by juniper overstory growth and exposed by juniper treatments.	
Clean vehicles, equipment, and shoes before entering National Forest System lands, so that there are no weed pieces nor mud which could carry weed seeds onto the project site.	Prevent introduction of new weeds.	Standard weed mitigation; please see Modoc National Forest Integrated Weed Management Strategy (USDA Forest Service, 2005).	
Minimize soil disturbance to the extent practical, consistent with project objectives.	Prevent creation of weed habitat at the expense of native vegetation.	Standard weed mitigation; please see Modoc National Forest Integrated Weed Management Strategy (USDA Forest Service, 2005).	
Range			
Salt would not be left in one place all season. All salt would be placed in the upper reaches of drainages, in the timber, on rock outcroppings, gravel pits, old closed road beds, and old logging landings. No salt would be placed in area with noxious weeds, sensitive plant populations, or in culturally sensitive areas. Salt would be placed at least ¼ mile from meadows, wet areas, creeks and water developments and would not be placed on or near open roads, in specific dispersed campsites, in or near noxious weed sites or within 300 feet of trailheads or trails. Permittees would be asked to identify all salting locations each year with the assistance of the District Range Management Specialist. No salt would remain in a pasture after the cattle have moved on.	To prevent livestock from congregating in areas with noxious weeds, sensitive plant locations, culturally sensitive areas, wet areas, around campgrounds, dispersed camping sites, trailheads, or near open roads.	HIGH: Experience	Rangeland Management Specialist & Technicians, Noxious weed specialist, other Forest Service personnel
The permittee will count the number of cows/calves turned onto the allotments and the number taken off the allotments. If animals are unaccounted for when leaving the allotments, the permittee will notify the Forest Service immediately and make a concerted effort to locate the animals	Permit Requirement & Compliance	MODERATE: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
The permittees shall mark all cows in such a way that allows for easy identification of ownership.	Permit Requirement	HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
If the herder and/or permittee are aware of or are notified that stray animals are outside the permitted area, the permittee or their agent are expected to make arrangement for retrieval of strays within 72 hours and make best efforts to find and retrieve them, and notify the Forest Service within 72 hours of their success or failure. The permittee, or their agent, is expected to make arrangements for retrieval of strays no more than 72 hours after discovery.	Permit Requirement & Compliance	HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Water rights and uses will be assessed as developed water sources are maintained, rebuilt, and developed.	State law	MODERATE: Experience	Rangeland Management Specialist & Hydrologist

Spring boxes will be kept clean to ensure that water flows freely from the spring box.	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas,	MODERATE: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Spring boxes, berms, and dams will be reconstructed and maintained as needed to prevent leakage, downstream erosion, and minimize the risk of failure. Adequate spillways shall be developed and maintained to allow the safe release of water. If needed, spillways will be hardened to ensure that down cutting does not occur.	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas,	HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Soils			
Maintain the exclosure fence on Little Parsnip Creek to eliminate grazing impacts from livestock. The exclosure predominately lies in T38N R14E in the N1/2 of the NW 1/4 of Sec 12.	The exclosure fence has deteriorated to the point where livestock has free access to the exclosure. The livestock that are spending time in the exclosure are trailing from the west of Parsnip Allotment to the east to the Blue Lake Allotment and back.	High: Experience	Soils Specialist & Technicians, other Forest Service personnel
The following should be adhered to when administering the juniper removal project so that soil productivity is maintained: at a minimum 30 % of the soil surface/duff is left in an undisturbed condition; equipment is kept off the soils when there is a high moisture content to prevent compaction, rutting, and puddling; and at a minimum leave five large cull logs per acre.	Modoc National Forest Management Plan Standards and Guides Preserve site productivity	High: Experience	Soils Specialist & Technicians, other Forest Service personnel
If there is machine piling of juniper it is recommended that it is done in a manner that does not move topsoil into the burn piles.	Modoc National Forest Management Plan Standards and Guides Preserve site productivity	High: Experience	Soils Specialist & Technicians, other Forest Service personnel
When administering the juniper removal project maintain forest floor litter, organic matter, and small and large woody debris. Retain and scatter all slash and woody debris from the cut trees. The amount of slash and woody debri retained will depend on the amount of logs available and the number needed to provide nutrient cycling and site productivity while also meeting minimum fuels treatment requirements in the Fire Suppression Difficulty Index (SDI).	The reasons include: increasing organic matter to improve site fertility; increasing woody debri to provide a microclimate by increasing shade; which, in turn, would increase soil moisture and decrease soil temperature; increasing woody debris would provide a temporary mechanical barrier to grazers allowing for increased vegetative growth; and retaining organic matter and woody debris on the site to provide protection and habitat for soil biota and wildlife. Leaving juniper debris on the ground after cutting can intercept runoff, increase infiltration, and reduce evaporative loss of soil water.	High: Experience	Soils Specialist & Technicians, other Forest Service personnel
Juniper reduction and associated activities will not result in detrimental soil disturbance over	Modoc National Forest Management Plan Standards and Guides	High: Experience	Soils Specialist & Technicians, other Forest Service personnel

the allowed 15% of the harvest unit	Preserve site productivity		
Insure soil Porosity is at least 90% of its natural condition. During wet soil conditions (as determined on a project level), cease heavy equipment operations or confine equipment and other soil disturbing activities to designated routes.	Modoc National Forest Management Plan Standards and Guides Preserve site productivity	High: Experience	Soils Specialist & Technicians, other Forest Service personnel
The mineral organic matter in the upper 12 inches of soil should be at least 85% of its natural condition.	Modoc National Forest Management Plan Standards and Guides Preserve site productivity	Moderate: Experience	Soils Specialist & Technicians, other Forest Service personnel
Design management activities not to exceed an average allowable soil loss of one ton per acre per year. This is mainly accomplished by leaving an effective ground cover.	Modoc National Forest Management Plan Standards and Guides Preserve site productivity	High: Experience	Soils Specialist & Technicians, other Forest Service personnel
Maintain suitable habitat for meadow-associated species using appropriate grazing utilization standards. Degraded meadow (e.g. early seral, with greater than 10 percent bare soil and active erosion) require total rest from grazing until recovered and moved to mid or late seral status.	Sierra Nevada Forest Plan Amendment Preserve site productivity	High: Experience	Soils Specialist & Technicians, other Forest Service personnel
Maintain long-term soil productivity; maintain and improve soil fertility, nutrient cycling, soil porosity, hydrologic function, and buffering capacity; minimized erosion. Implement soil quality standards (as outlined in Appendix F). Attain standards for ground cover, compaction, and ground disturbance, so that the risk of sediment delivery to aquatic systems from management activities is minimized.	Sierra Nevada Forest Plan Amendment Preserve site productivity	Moderate: Experience	Soils Specialist & Technicians, other Forest Service personnel
Wildlife			
GOLDEN EAGLE Modoc NF Standards and Guidelines: Disturbance from Timber management activities, firewood cutting, OHV use, and maintenance/construction of roads, trails or facilities will be restricted within ¼ to ½ mile of the nest during the reproductive period, February to August, because they may be detrimental to nesting and fledging. (LRMP 4-27).	Protect eagle reproduction.	Disturbance from these activities may be detrimental to nesting and fledging. (LRMP 4-27).	Wildlife biologist and Project Manager.
OSPREY Modoc NF Standards and Guidelines: Restrict timber management activities, firewood cutting and OHV use within 1/8 to ½ mile of	Protect osprey reproduction.	Disturbance from these activities may be detrimental to nesting and fledging.	Wildlife Biologist and Project Manager.

nest from March to August. (LRMP 4-28).			
PRAIRIE FALCON Modoc NF Standards and Guidelines: Restrict disturbance from timber activities and human activities, including foot traffic and OHV use, within ½ mile of the nest during the reproductive period, March 1 to August 31, as they would be detrimental to nesting and fledging. (LRMP 4-28).	Protect prairie falcon reproduction.	Disturbance from these activities may be detrimental to nesting and fledging.	Wildlife Biologist and Project Manager.
BALD EAGLE Modoc NF Standards and Guidelines: Timber Management activities will be scheduled within active nest territories and within ¼ mile of foraging and loafing trees between August 15 and November 1. Timber management activities within wintering areas between April and October (LRMP 4-89).	Protect nesting and wintering bald eagles.	Disturbance from timber management activities may be detrimental to nesting, fledging, and wintering bald eagles.	Wildlife Biologist and Project Manager.
PRONGHORN Modoc NF Standards and Guidelines: Analyze the effects of livestock grazing on pronghorn habitat and forage availability (LRMP 4-29) For planning purposes, use the forage requirement for pronghorn of one pound of herbaceous forage per pronghorn per day, which is equivalent to 30 pronghorn per Animal Unit Month (AUM) (LRMP 4-29). Follow the fence standards described in the Modoc supplement to the FSM (LRMP4-29). Manage forbs and shrubs to provide a vigorous forage base with a diversity of forage species. Improve forage conditions where browse is decadent to favor a variety of grasses, forbs, and shrubs suitable for pronghorn. Manage rangelands with the objective of achieving desired ecological condition which is conducive to pronghorn (LRMP 4-97 and LRMP-106).	Protect pronghorn and their habitat.	Pronghorn are dependent on adequate forage and accessible habitat.	Wildlife Biologist and Project Manager.
MULE DEER Modoc NF Standards and Guidelines: For mule deer, on winter ranges, units will not be larger than 50 acres (LRMP 4-107) – *Parsnip*	Protect habitat of mule deer.	Pronghorn are dependent on adequate forage and accessible habitat	Wildlife Biologist and Project Manager.

Allotment only With the exception of prescribed burns, Units will be irregular in shape and designed so that they are no more than 600 feet from cover from any point. For example, within a 100 –acre unit, leave 5 to 10 leave islands of cover, ranging in size from 2 to 5 acres (LRMP 4-102) – *Parsnip Allotment only* Analyze the effects of livestock grazing on seasonal forage requirements in assessing capability and stocking levels for all allotments, and in developing AMPs. Refer to EIS Appendix L for information on deer forage requirements (LRMP 4-29). Herbs and shrubs will be managed to provide a vigorous forage base with a diversity of forage species. Forage and cover areas will be developed where they are insufficient, and a mixture of forage and cover areas will be maintained in proper balance. (LRMP 4-97) – *Outlet and West Valley Allotments only*.			
WILDLIFE - GENERAL <u>Modoc NF Standards and Guidelines:</u> When necessary, fence the water source from livestock access, piping the water to drinking trough or other receptacle (LRMP 4-97 and LRMP 4-105).	Protect water sources for wildlife.	Fencing maybe necessary to protect water sources for wildlife.	Wildlife Biologist and Project Manager.

2.5 Monitoring

The Ecological Condition Matrix and Monitoring Plan from the Warner Mountain Rangeland Project Environmental Assessment were used and would continue to be a component in the South Warner Grazing Environmental Assessment (EA). The Matrix and Plan can be found in Appendix D. In addition, the Sage Steppe Ecosystem Restoration Strategy Vegetation Monitoring Protocols would be implemented with this South Warner Grazing EA and can be found in Appendix D in full detail.

Monitoring is a key component of successful management and compliance with pertinent laws and policy. Decisions regarding identifying any need to change management, and the direction that the change should take are based upon evaluation of the results of monitoring. Monitoring would target those indicators that are annually influenced by livestock grazing (implementation monitoring) and those that indicate the long term condition (effectiveness monitoring).

Implementation monitoring, annually, is used to make short-term adaptive decisions regarding removal of livestock and adjustments in timing, intensity, duration, and frequency of grazing. The long term effectiveness monitoring, every 3 – 5 years, would be used to determine if satisfactory progress is being made toward meeting the management objectives and thus the desired conditions If not, this would inform the Range Management Specialist of the need to look at the suite of adaptive management options and adjust management strategy.

Implementation Monitoring

Implementation monitoring can be either scheduled or unscheduled. Scheduled implementation monitoring is carefully planned to display implementation levels in areas where management interest is focused.

Objectives:

- To determine compliance with the Term Grazing Permit and the Annual Operating Instructions.
- To evaluate the implementation the management practices to insure movement from the Existing Condition towards the achievement of Desired Condition, and use Adaptive Management to adjust livestock strategies as necessary to meet Desired Conditions.
- To demonstrate to all interested parties and partners that implementation of the Allotment Management Plans is effective in achieving multiple use management and is sound resource management of Forest Service lands.

Implementation of utilization standards monitoring will occur on established key areas, which have been established by the Forest Service in consultation, coordination and cooperation with the Permittees and incorporating information provided by any other interested parties. These key areas have been identified and can be found in Appendix D, Monitoring.

Timing of monitoring:

- Pre-season monitoring – Range Readiness and improvement maintenance
- Monitoring during grazing season- focus on key areas, use ecological matrices
- Monitoring post-grazing- focus on key areas, within 10 days of completion, use ecological matrices
- Monitor competition and interaction between livestock and wildlife for forage

Responsibility for Monitoring

The Forest Service is responsible for determination of range readiness and pre-season use levels by wildlife.

Monitoring during grazing season will primarily be the responsibility of the Permittee. The Forest Service or other interested parties may also conduct monitoring during grazing. When feasible the monitoring will be done cooperatively by the Permittee, any other interested parties and the Forest Service.

Methodology for Monitoring

- Range Readiness
- Landscape Appearance, Herbaceous
- Residual Riparian Vegetation (Streambank Alteration and Stubble Height)
    - Representative Reach Method or
    - Pace Method
- Browse Use
    - Landscape Appearance, Browse Method
- Pace Method for Aspen Utilization

Unscheduled Implementation Monitoring

Unscheduled implementation monitoring is unplanned and usually occurs as a by-product of involvement in another activity in the vicinity. This may occur outside of key areas.

Long-Term Effectiveness Monitoring

To evaluate the effectiveness of prescribed management practices in attainment of Desired Conditions, assuming that annual implementation monitoring reflects proper application of management practices prescribed. If properly implemented practices will be changed as necessary to attain the Desired Conditions.

Benchmarks are areas where implementation of prescribed management practices are crucial to long-term attainment of Desired Conditions and are site-specific to each Allotment and/or pasture identified in a grazing system. The list of Benchmarks for the allotments can be found in Appendix D.

Benchmarks in Streams, Springs and Seeps Ecological Communities will be monitored in three to five year intervals. In Uplands and Aspen Ecological Communities will be monitored every five years.

Responsibility for Monitoring
Effectiveness monitoring will be conducted on benchmarks by the Forest Service in cooperation with the Permittee and any other interested parties.

Methodology:
Following are descriptions of long-term monitoring techniques that are commonly used to measure benchmarks for various ecological communities.

- Frequency Plots
- Permanent Photo Plots
- Channel Morphology
- Greenline Transect
- Woody Species Regeneration
- Rooting Depth

Annual (Implementation) Monitoring and Long-term (Effectiveness) Monitoring have been discussed previously. In order to clearly display the relationships of these types of monitoring and to clearly define time frames and responsibilities, the following tables are outlined below.

Table 12. Implementation monitoring

Monitoring Item	Method	Measurement Frequency	Action to be Taken
Fee Payment	Bills for Collection	Annually Actual Use Billing	Bill not paid by due date, change to preseason billing.
Range Readiness	R5 Range Readiness procedures	Annually, pre-season as needed	Adjust on-date up to two weeks earlier or later as needed.
Actual/Allowable Use (Riparian & Uplands)	Ocular estimates or Landscape Appearance or Aspen Pace Plots or Photo Plots	Annually	Move livestock to next pasture or home when allowable use is reached.
Residual Riparian Vegetation	Stubble Height or Streambank Alteration or Seep/Spring Pace	Annually	Adjust use as needed to meet riparian objectives. Move livestock to next pasture or home when allowable use is reached.
Permit/AOI Compliance	Allotment inspections / unit examinations	Annual spot-checks	Direct compliance to terms & conditions take appropriate permit action FSH 2809.13.

Table 13. Effectiveness Monitoring

Monitoring Item	Method	Measurement Frequency	Purpose of Monitoring
Riparian Vegetation Trend	Frequency Plots, Permanent Photo Points, Channel Morphology, Woody species regeneration rooting depth	Every 3-5 years.	Determine progress toward Desired Conditions (DCs).
Upland Vegetation	Permanent Photo Points, cover, frequency plots	Every 5 years	Determine progress toward DCs.
Browse Vegetation Trend (Aspen)	Density /Frequency Plots, Permanent Photo Points, Woody species regeneration	Every 5years.	Determine progress toward DCs.

Soil & Hydrology	BMEP G-24	Random 1-5 years	Determine progress toward DCs

Sage Steppe Ecosystem Restoration Strategy Vegetation Monitoring Protocols

The minimum monitoring data to measure progress in meeting objectives and to adjust the types of restoration treatments based on monitoring results. Design standards that will be monitored are desired vegetation cover and composition objectives. The agency will report these monitoring results annually. The protocols can be found in Appendix D.

Botany Monitoring

Sensitive plant sites will be monitored for five years. The first year of monitoring will take place before the commencement of juniper treatment activities, in order to establish a baseline. Monitoring will continue every year thereafter for four more years. Each year, the number of plants will be counted at each site, and the general health of each population will be assessed qualitatively and recorded on standard California Natural Diversity Database and Forest Service forms. The botany monitoring records will be kept with the rest of the sensitive plant files in the botany office. If monitoring determines that populations are declining, and can identify the likely drivers of decline, actions designed by the Forest Botanist to prevent further decline will take place as part of continued allotment management.

Noxious Weed Monitoring

Weed sites CEDI391409C, ONAC391422J, and SAAE391409D will be monitored and manually treated prior to juniper treatments, according to normal weed monitoring and treatment protocols. They will also be monitored and if necessary retreated the spring following the completion of implementation, in order to prevent these weeds from establishing themselves in the disturbance following juniper treatment.

Heritage Resource Monitoring

The archaeological sites within the allotments should be rated by known or anticipated level of significance and susceptibility to livestock disturbance. The highest rated sites ("priority heritage assets") should be monitored on a five-year cycle. At present, two archaeological sites have had monitoring stations placed on them and will be visited at least three times per year for the next two years in order to identify the nature and type of livestock disturbance and whether or not mitigation measures may be necessary.

CHAPTER 3: ENVIRONMENTAL CONSEQUENCES

This chapter focuses on the affected environment and environmental effects (direct, indirect, and cumulative) for those resources that the project intends to improve from the existing conditions (needs for the project). This section summarizes the physical, biological, social and economic environments of the affected project area as well as the potential changes to those environments resulting from implementation of the alternatives. This section presents the scientific and analytical basis for comparison of alternatives presented in the Comparison of Alternatives Table (Table 10) in Chapter 2.

Direct environmental effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or are spatially removed from the activity, but would occur in the foreseeable future. Cumulative effects result when the incremental effects of actions are added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. Past, present, and reasonably foreseeable future actions are assessed along with the effects of the Proposed Action to determine whether significant cumulative effects may occur. A list of existing and reasonably foreseeable projects considered in determining cumulative effects for various resources is included in Appendix F.

Common assumptions to all analyses:

- Project design measures are implemented and Forest Plan standards and guidelines are followed;
- Geographical Information System (GIS)[10] data is sufficiently accurate to support meaningful analysis;
- Rangeland vegetation and grazing would be managed through administration and monitoring of grazing permits and annual operating instructions; and
- The analysis is for the 10 year life of the permit.

3.1 Rangeland Resources

3.1.1 Introduction

A Range Specialist Report was prepared to analyze rangeland resources on the Outlet, West Valley, and Parsnip Allotments. This section will address the condition of range resources as well as the environmental consequences of the proposed action to those resources. This is a summary of the range specialist report in the analysis file.

3.1.2 Scope of Analysis, Methodology, and Indicators

The analysis area for rangeland resources consists of 17,286 acres of Forest Service lands within the Outlet, West Valley, and Parsnip Allotments. The analysis addresses effects on rangelands within the allotments using key areas and benchmarks as representative sites. Potential effects of the PA and alternatives were determined by measuring and comparing a set of analysis indicators. These indicators were selected for their relevance to direction found in the LRMP (and as amended) that describes Forest goals and desired resource conditions. In this report

analysis indicators include applicable Forest standards and guidelines (S&G) which, in principle, are the mechanisms by which Forest goals are achieved and maintained. S&G establish qualitative and quantitative measures that serve as indicators of ecosystem health. The ability to meet S&G and, ultimately, desired conditions serves as the basis for comparison of each alternative.

Analysis Indicators

Rangeland analysis indicators include:

- Livestock Use Standards—Standards include percent forage utilization, stubble height, browse, and streambank alteration. Utilization standards vary according to vegetation type and rangeland condition (Appendix D).

- Range condition and trend— General relationships between rangeland and ecological conditions are described in Table 14. Condition matrices further define satisfactory (desired) and unsatisfactory ecological condition for different upland and riparian vegetation types in Appendix D. The condition matrices provide: a crosswalk between commonly used range condition and trend rating methods; components or indicators of rangeland health; and applicable standards and guidelines.

Range Condition	Trend	Ecological Condition
Excellent	Static	Satisfactory
Good	Static/Upward	Satisfactory
Fair	Upward/Static	Satisfactory
Fair	Downward	Unsatisfactory
Poor	_	Unsatisfactory
Very Poor	_	Unsatisfactory

Table 14: Relationship between Range and Ecological Condition.

- Provision of grazing opportunities—the ability of a given management alternative to provide sustainable livestock grazing opportunities to livestock operators.

3.1.3 Affected Environment

3.1.3.1 Forage Production

Forage Analysis is conducted to establish potential livestock numbers, or carrying capacity. The following is a general outline of how it is measured. Forage species are measured across allotments in differing vegetation types. The vegetation types reflect the type of "range" or grazing area that livestock would utilize.

Transitory range is range created by timber sales or fuels reduction projects openings created in the overstory. The understory responds with increased vegetative growth and produces palatable available forage. Forage production in transitory range will eventually diminish as canopy cover

re-establishes and shades the understory (Spreitzer, 1985). This time lag for canopy cover is considered in forage production calculations. Primary and secondary ranges are those areas which are naturally more open or permanent range areas such as south facing slopes with shrub steppe communities. Primary range typically has water readily accessible to livestock through constructed water developments or approved and monitored natural sources. Secondary range has very limited water supplies, is utilized less, and AUM availability are adjusted accordingly.

Determining gross forage production is accomplished by clipping and weighing forage vegetation samples in different range types. The clipped forage species are graminoid ("grass like") or small forbs not browse species (aka: shrubs). This allows for Animal Unit Months (AUMs) to be calculated on these vegetation types. It does not allocate browse species such as shrubs to livestock. Although use occurs on shrubs, it is usually lighter. It occurs after the "grass like" species have reached their appropriate utilization levels and the livestock are being moved into other areas.

Measurement obtains representative biomass production information. It incorporates production with the number of acres of the range types available in each allotment. A percentage of the gross production is set aside first for wildlife forage and habitat. Only then is the remaining forage be allocated to grazing livestock. The livestock number is not set at an allotment's maximum available forage. The remaining forage, after the wildlife set aside, exceeds the forage allocated for livestock permits. This creates an unallocated forage "buffer" to prevent inadvertent overuse. It provides vegetative structure for habitat and forage for other resources. It allows year to year forage production variances, preventing grazing levels to exceed forage production.

Forage production calculations for the Outlet, West Valley, and Parsnip Allotments display higher production levels than existing stocking levels. This indicates "Capability." However, forage production does not dictate stocking levels alone. Other resources needs and concerns affect stocking levels, thereby the AUMs which are allocated to the allotment. Specialist input on resource conditions and effects, accompanied with field measurements and observations; influence time and livestock numbers. Examples include timing which livestock might access a rare plant population, or limiting grazing use in an area with riparian concerns. The detailed forage analysis is in the analysis file with the Range resource report.

The following table (Table) summarizes Capability or AUMs available for livestock grazing on National Forest System lands by allotment, post consideration of other resource values (ex: wildlife habitat and forage).

Allotment	**Acres in GIS**	**Suitable and Capable Forage Acres**	Animal Unit Month **(AUMs)**[1]
Outlet	5,608	4,678	645
West Valley	5,354	2,696	506
Parsnip	7,016	3,867	524

Table 15: Allotment Capability Summary.

[1] Animal Unit Month (AMU) is the amount of forage required by one mature (1000 lb) cow, or its equivalent, for one month.

3.1.3.2 Monitoring

To ensure management direction as outlined in the Annual Operating Instructions (AOI, annual management instructions to the permittee) is followed, range management staff conducts allotment inspections throughout the grazing season. The inspection allow for verification that the instruction is being adhered to. Allotment resource monitoring takes place throughout the grazing season. This day-to-day monitoring allows for adjustment to the instructions, if necessary, as response to change in resource conditions. End of season monitoring is completed on allotments as a measure of compliance with the allowable forage use standards and is also an indicator of successful management.

Two types of monitoring have occurred on the allotments; effectiveness monitoring and implementation monitoring. Effectiveness monitoring is long-term monitoring that is done in order to conclude whether the Forest Plan standards and guidelines for grazing are sustaining or moving the rangeland toward desired conditions and to establish baseline information for future planning. Implementation monitoring is short-term monitoring that is done to conclude whether the Forest Plan standards and guidelines for grazing are being met.

Short term monitoring occurred on the allotments at the key areas and the results can be found in the following Table 16. All three allotments have met utilizations standards for 2010, 2011, and 2012. In 2011, it was an above precipitation year with an abundant of forage, therefore the utilizations were lower.

Outlet Allotment						
Site	**Pasture**	**Standard**	**Ecological Type**	**2010**	**2011**	**2012**
K01	Juniper Flat	Herb: 55% Browse: 20% Stubble Ht.: 3" Streambank Alteration: 20%	Riparian	40.6% Herb	23.7% Herb	50.7% Herb
K02	West	Herb: 50% Browse: 20%	Upland		29.8% Herb	48.8% Herb
West Valley Allotment						
Site	**Pasture**	**Standard**	**Ecological Type**	**2011 Average Utilization**	**2012 Average Utilization**	
B01	North Unit	Herb: 50% Browse: 20%	Upland	29.5% Herb	46% Herb	
K01	West Valley	Herb: 50% Browse: 20%	Upland	23.4% Herb	46% Herb	

K02	West Valley	Herb: 50% Browse: 20%	Upland	18.8% Herb	47.3% Herb
K03	Parsnip Table	Herb: 50% Browse: 20%	Upland	32.5% Herb	46% Herb
K04	Parsnip Table	Herb: 50% Browse: 20%	Upland	22.4% Herb	43.3% Herb
Parsnip Allotment					
Site	**Pasture**	**Standard**	**Ecological Type**	**2011**	**2012**
K01	North Unit	Herb: 35% Browse: 20% Stubble Ht.: 5" Streambank Alteration: 20%	Riparian	21.7% Herb	29.2% Herb
K02	North Unit	Herb: 50% Browse: 20%	Spring/Seep	16% Herb	44.1% Herb

Table 16: Outlet, West Valley and Parsnip Short-term Monitoring for 2010-2012

3.1.3.3 History of Use

Outlet Allotment:

The Outlet Allotment has been grazed since the early 1900's although, in the 1940's the first efforts to regulate the use were documented. From the 1940's to the early 1980's, permitted use was 130 pairs. From the 1980's to the present the permitted use on the Outlet Allotment is for 173 cow/calf pairs, equivalent to 347 head months(HM) or 458 Animal Unit Months (AUMs), between May 1st and June 30th (Table 1). An additional 55 cow/calf pairs, equivalent to 85 head months or 112 AUMs, run between May 15th and June 30th.

The HM number is lower than the AUM because it considers the number of mature animals and not the calves. The Outlet Allotment has used a three-pasture deferred early grazing system with re-growth. Livestock are rotated through three pastures which Juniper Flat, West, and Table. Periods of use within each pasture vary from year to year depending on various factors such as weather, and are identified in the Annual Operating Instructions. Over the last several years actual use under current management has been less than permitted use (Figure 5: Actual Use vs. Permitted Head Months Use for Outlet).

Pasture/Unit	Acres	Number	Season of Use
Juniper Flat	1,563	55 pair	5/15-6/1
West	1,293	173 pair	5/1-6/1
Table	2,422	228 pair	6/2-6/30

Table 17: Example of a 3 Pasture Differed Early-Season Grazing System on Outlet Allotment.

The following describes the existing units by allotments. The list of existing range developments can be found in Appendix C.

The Juniper Flat (approximately 1,563 acres) is used for the additional 55 pairs. It currently contains no water developments.

The West Pasture (approximately 1,293 acres) is used for the 173 pairs. It also currently contains no water developments.

The Table Pasture (approximately 2,422 acres) is used for full numbers of 228 pairs. It currently contains three stock tanks. Part of the Table pasture has a section called the Unknown which has been used for seasonal livestock trailing.

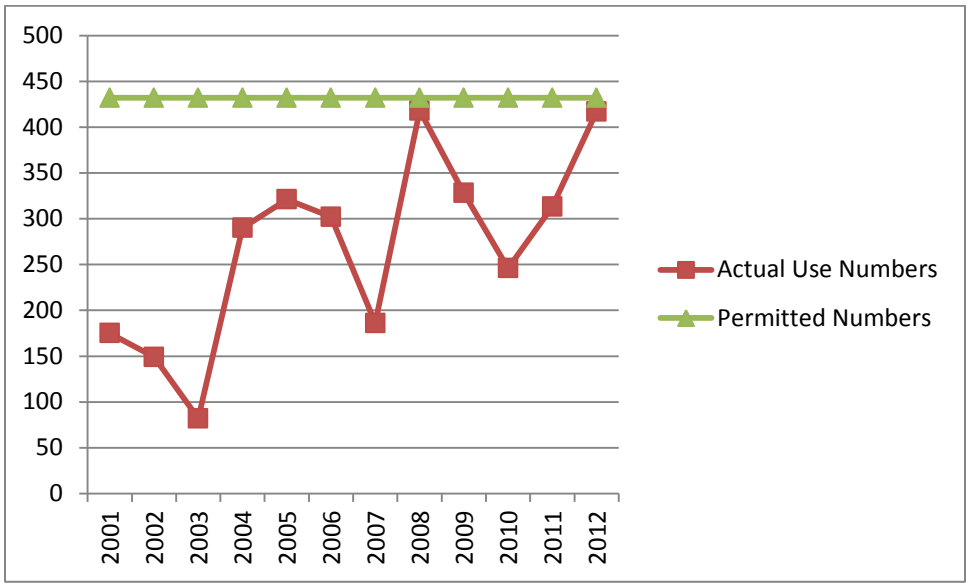


Figure 5: Actual Use vs. Permitted Head Months Use for Outlet Allotment.

West Valley Allotment:

Historically, the West Valley Allotment has grazed 425 pairs from the 1960's and was reduced to 315 pairs in the early 1980's. The West Valley Allotment is permitted for two cow/calf operations run under a two-pasture deferred early-season grazing system with re-growth. A number of structural range improvements are in place to assist with animal distribution within and between pastures. Periods of use within each pasture vary from year to year depending on various factors such as weather, and are identified in the Annual Operating Instructions (AOI). Following use of the West Valley Allotment, part of the permitted livestock is moved to the Parsnip or Blue Lake Allotments to finish the grazing season.

The current permitted use is for 315 cow/calf pairs to graze between May 1st and June 30th. This is equivalent of 632 HMs or 834 AUMs. Though from the actual use records that are turned in by the permittee, the season of use has been shorter with later turn-on dates and earlier turn-off dates.

The allotment contains two pastures: West Valley Pasture (approximately 1,499 acres) and the Parsnip Table Pasture (approximately 3,853 acres). West Valley pasture has one water

development and Parsnip Table pasture has one water trough and 10 stock tanks to provide better livestock distribution throughout the allotment. See Table 18.

Pasture	Acres	Number	Season of Use
West Valley	1,499	140 pair	5/1-5/20
Parsnip Table	3,853	140 pair	5/20-6/30
Parsnip Table		175 pair	5/1-6/30

Table 18: Example of Grazing System Schedule for the West Valley Allotment.

One permittee will graze 140 pairs in the West Valley pasture approximately 20 days and then move them to the Parsnip Table pasture to finish the season, while the other permittee grazes 175 pairs in Parsnip Table for the permitted season. The permittee that grazes 175 pairs has taken non-use for resource protection from 1996-2005 and non-use personal convenience from 2006-2009, therefore the allotment has not had the full permitted numbers for several years. Total actual use under current management has been less due to the permittee with non-use (Figure 6).

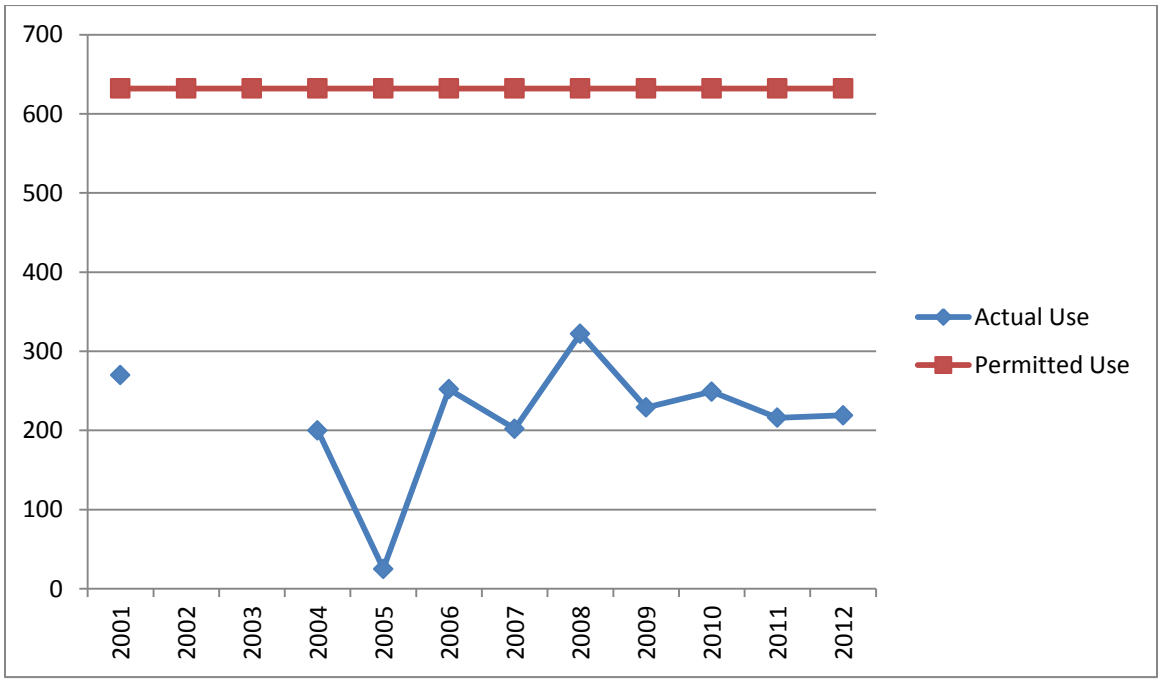


Figure 6: Actual Use vs. Permitted Head Months Use for West Valley Allotment.

Parsnip Allotment:

The Parsnip Allotment is permitted as a cow/calf operation that historically used a combination of grazing systems (Table 19). This allotment used to permit 285 pairs from the 1940's to the 1980's. In the 1980's it was reduced to 65 pairs. A number of structural range improvements are in place to assist with animal distribution within and between pastures. Up to 50 pair, equivalent to 150 head months or 199 Animal Unit Months , are permitted between July 1st and September

30th (Table 19). An additional 15 pair, equivalent to 75 head months or 99 Animal Unit Months , are permitted between May 1st and September 30th.

Except for seasonal livestock trailing between the West Valley Allotment and the Blue Lake Allotment, grazing has not been authorized in the Parsnip Allotment. The permittee that has the permit was granted non-use for resource protection from 1996 to 2005 and took non-use for personal convenience from 2006 to 2009.

In 2001, the Blue Fire burned the east side of the Parsnip Allotment. The Parsnip Allotment was rested for two years after the fire (2002-2003), to allow for vegetation recovery. The permittee was granted non-use for resource protection.

Pasture	Acres	Number	Season of Use
North	3,250	50 pair	7/1-7/31
South/Special Use	3,632	50 pair/15 pairs	8/1-9/30 - 5/1-9/30

Table 19: Current grazing system schedule for the Parsnip Allotment.

The 50 pairs are typically grazed in a two-pasture deferred system which utilizes the North pasture for approximately one month in the early season, and the South pasture for the remainder of the season. The North pasture (approximately 3,250 acres) contains five stock tanks and the South pasture (approximately 3,632 acres) which consists of a Special Use pasture that was grazed in conjunction with co-mingled private land.

3.1.3.4 Existing Condition of Riparian and Upland Areas in the Allotments

Field visits were conducted to the project area from July 24th thru July 27th, 2011.

Outlet

Riparian

Riparian areas along the South Fork of the Pit River exhibited an overstory composed of willows, cottonwoods, ponderosa pines, and aspens. Junipers were also a common overstory component within the riparian areas, evidently due to encroachment. Sedges and rushes occurred in the understory, as did perennial grasses and forbs such as horsetail (*Equisetum arvense*). Large woody debris was common in the stream and boulders armored the streambanks in many locations.

Reach 311 of the South Fork Pit River was rated as proper functioning condition in 1999 and as functioning at risk with an upward trend in 2011. The channel shows signs of degradation from unauthorized equipment work conducted after the initial survey, is disconnected from its original floodplain, but is rebuilding a new floodplain several feet below the historic one. Riparian plant communities were in mid-seral condition (on the high end) and showing signs of natural succession towards late-seral condition. Woody riparian species, such as willow, were well-represented by multiple age classes and did not shows signs of hedging which would indicate a history of excessive browse.

Proper functioning condition status in Reach 312 was maintained between 1999 and 2011. Dense late seral vegetation including willows, sedges, and rushes occupy the steep, boulder-strewn banks. Livestock access is very limited due to the rocky substrate in the reach, as well as the presence of a highway on the north side of the stream.

Reach 313 of the South Fork Pit River was rated as proper functioning condition in 1999 and as functioning at risk in a downward trend in 2011. A significant amount of material was deposited in this reach as a result of unauthorized work conducted upstream in Reach 311. The existing floodplain now appears to be eroding, particularly around the roots of juniper trees that have encroached into the riparian area, as it seeks to find new equilibrium. Recent surveys were conducted during a high water year and high flows may have triggered bank erosion. While juniper encroachment may be contributing somewhat to a downward trend, effects resulting from upstream disturbance are dominant and likely responsible for the mid- , almost early-seral, overall condition of the plant community.

Populations of woody riparian species, such as willow and cottonwood are present and appear bimodal. While the gap between young willows and cottonwoods and older members of those species suggests past livestock disturbance, abundant, un-browsed recruitment indicates that overgrazing is not ongoing.

Wet meadow habitat within the allotment exhibited vigorous plant communities with expected distributions of appropriate functional/structural groups. Vegetation was dominated by native perennial grasses such as meadow barley (*Hordeum branchyantherum*), meadow foxtail (*Alopecurus pratensis*), mountain brome (*Bromus carinatus*), Canada wild rye (*Elymus Canadensis*) and bottlebrush squirreltail. Non-native perennial grasses were also present, commonly represented by Kentucky bluegrass, with sporadic occurrences of intermediate wheatgrass (*Thinopyrum intermedium*), and bulbous bluegrass (*Poa bulbosa*). Invasive species such as bull thistle were noted in meadow habitat, but not in large numbers, and cheatgrass appeared confined to pockets of disturbed areas on meadow fringes. Litter formed 35% of the remaining ground cover while bare soil represented 16%. No signs of accelerated erosion or runoff were observed and site stability was within expected parameters.

Upland

During the 2011 field visit, forage utilization appeared light to moderate after the end of the grazing season. Upland vegetative production appeared vigorous and included blue wild rye (*Elymus glaucus*), bottlebrush squirrel tail (*Elymus elymoides*), bulbous bluegrass, cheatgrass, Kentucky blue grass, Lemon's needlegrass, and Sandberg bluegrass. Seed heads were abundant on all grass and graminoid species.

On upland site adjacent to the gravel pit (within a juniper treatment), bare soil was 14% of the ground cover and erosion pavement was 3%. Litter, rock and live vegetation provided 30%, 5%, and 48% of the ground cover respectively. Juniper cover was estimated at 7% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately a 50/50 mix). An assortment of annual forbs, formed 60% of the species composition, followed by weedy species like cheatgrass (25%), and more desirable species including Sandberg bluegrass (15%). Litter and live vegetation formed 78% of ground cover and appeared to occur in amounts

adequate enough to prevent accelerated erosion. While some pedestals were observed, water flow patterns were not excessive, and neither rills nor gullies were present. It is likely that erosion occurred in the past and was the result of wind since the flatness of the site and rocky nature of the soil was not conducive to a great deal of overland water flow.

On another upland site adjacent to the South Fork of the Pit River, bare soil was 14% of the ground cover and erosion pavement was 8%. Litter, rock and live vegetation provided 24%, 26%, and 28% of the ground cover respectively. Juniper cover was 31% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately a 60/40 mix). Perennial grass species including bottlebrush squirrel tail, Lemon's needle grass, and Sandberg bluegrass formed 50% of the species composition followed by invaders like cheatgrass and bulbous bluegrass (39%), and other plants such as lupine and annual forbs (15%). Litter and live vegetation formed 52% of ground cover and, with rock, appeared to occur in amounts adequate enough to prevent accelerated erosion. While some pedestals were observed, water flow patterns were not excessive, and neither rills nor gullies were present. It is likely that past erosion was the result of wind since the flatness of the site and rocky nature of the soil was not conducive to overland water flow.

A 2009 survey indicated that a nearby dry meadow key area adjacent to the South Fork Pit River was in "low" overall condition. Bare soil covered 9% of the site and early seral plants consisted of 98% of the species composition.

A 2011 survey, while not recreating the 2009 study, did indicate a very similar amount of cheatgrass in the area (~33% in 2009 and ~29% in 2011). However, early seral species, especially annual forbs, appeared less common while late seral perennial graminoids appeared to increase in abundance.

U. S. Department of Agriculture Natural Resources Conservation Service (NRCS) studies within the allotment found that perennial grassland sites generally had expected suites and distributions of appropriate species, dominated by Sandberg bluegrass, bottlebrush squirreltail, assorted native forbs, and shrubs. Intermediate wheatgrass was also a common perennial component. Cheatgrass, while present, was mostly scattered and not dominant. Plants were vigorous and were contributing litter to the soil surface. Shrub communities (big sage, low sage, mountain sage) tended to exhibit understories of vigorous perennial grasses (Sandberg bluegrass, bottlebrush squirreltail, intermediate wheatgrass) and mixed forbs, but numerous exotic annual grasses were also observed.

Figure 7: Upland Adjacent to the South Fork Pit River

Cheatgrass, Japanese brome, and medusahead were common in these shrub communities and appeared to be displacing desirable native perennial species. Juniper encroachment was also thought to be responsible for a reduction of understory components in the mountain sage and low sage types. Where juniper invasion was advanced, shrubs had generally been eliminated from the plant community, bare ground was higher than expected for the sites, and cheatgrass was abundant.

Date	Site	Vegetation Condition	Overall Condition	Vegetation Trend	Overall Trend
8/5/2009	dry meadow	low	Low	-	-

Table 20: Condition Scores for a Dry Meadow Adjacent to South Fork Pit River.

While sites appeared stable overall and active rill and gully erosion were not observed on the allotment, signs of historic erosion do exist. Many mature perennial grasses were pedestalled and the "A" horizon, while present, appeared fragmented in places. It is likely that historic soil loss was wind-driven and occurred over a long period of time. Bare soil was present in consistent amounts across surveyed areas, but current plant and litter cover was well distributed across the allotment and appeared to be protecting sites from erosion. Although exotic grasses were present, most of the allotment appeared to be dominated by native vegetation. Juniper treatments have been previously implemented, but encroachment is still occurring on tables, flats, and valley bottoms within the allotment.

West Valley

Riparian

Range condition of a wet meadow site in the vicinity of West Valley Springs was rated as moderate with a downward trend in 2008 (Table 7). The proportion of early-seral and mid-seral species increased (11% → 26% and 11% →38% respectively) while late-seral species decreased

(79% → 35%). Bare soil also showed a large increase on the site, growing from 4% cover to 47% cover. Rooting depth increased from 22 inches to 30 inches.

Date	Site	Vegetation Condition	Overall Condition	Vegetation Trend	Overall Trend
7/17/2003	wet meadow	high	High		
7/8/2008	wet meadow	moderate	moderate	Down	down

Table 21: Range Condition Scores for the West Valley Allotment.

A fen, about 1/10 of an acre in extent, was located just above a valley constriction (north 41° 12.126', west 120° 22.858') off the main road (39N19) that runs through the allotment (Figure 8). It is a grassy mound that may be caused by upwelling of groundwater flow over bedrock that is exposed in the degraded channel 30 feet away. The surface of the fen is spongy, having a "trampoline effect" when stepped on. It was covered with hydrophytic herbaceous vegetation, but appeared to be drying around the fringes in July. The fen was also pock-marked with hoof-prints across its entire area, exposing peat on its surface (Jackson, 2012).

Figure 8: Fen Site in 2011

Reach 325, Parsnip Creek, was in proper functioning condition. Riparian vegetation was in mid- to late-seral status (an upward trend from early-seral status in 2002). Woody riparian species such as dogwoods and willows displayed a good distribution of age-classes and high vigor.

NRCS evaluation of a wet meadow site in the allotment revealed that species composition reflected functional/structural groups and distribution of species that was expected for the moisture regime. Soil cover was generally continuous; however some loss of vegetation and the formation of water flow patterns was linked to a gullied channel in the meadow. Historic channel downcutting may have led to the lowering of local water tables and is therefore responsible for shifts toward drier species seen in adjacent areas (Jackson, 2012).

Upland

Forage utilization appeared light to moderate after the end of the 2011 grazing season. Upland vegetative production appeared vigorous. Seed heads were abundant on all grass and graminoid species. Upland grasses included blue wild rye, bottlebrush squirrel tail, bulbous bluegrass, cheatgrass, Kentucky blue grass, Lemon's needlegrass, and Sandberg bluegrass. Western juniper was the dominant overstory species.

On a dry upland site within a juniper treatment, bare soil was 4% of the ground cover. Litter, rock and live vegetation provided 31%, 5%, and 60% of the ground cover respectively. Perennial grass species including bluebunch wheatgrass, bottlebrush squirrel tail, Idaho fescue, and Lemon's needle grass formed 5% of the species composition, annual forbs formed 25% of the composition, and annual grasses (primarily cheatgrass) formed 70% of the composition.

On another dry upland site, bare soil was 15% of the ground cover. Litter, rock and live vegetation provided 8%, 44%, and 33% of the ground cover respectively. Perennial grasses including bottlebrush squirrel tail, Idaho fescue, and Sandberg bluegrass formed 42% of the species composition, while an assortment of species including forbs formed 58% of the composition.

NRCS studies of perennial grassland, big sage, low sage, and mountain sage communities appeared relatively consistent with the above findings. Species present were largely expected for the site. However the presence of exotic annual grasses like cheatgrass, Japanese brome, and medusahead was a concern. Juniper encroachment was also a factor and tended to be associated with higher levels of bare ground in the allotment.

Overall, uplands within the West Valley Allotment appeared to be functioning since active rill and gully erosion were not observed on the allotment. But signs of historic erosion do exist. Many mature perennial grasses were pedestalled and the "A" horizon, while present, appeared fragmented. It's likely that historic soil loss was wind-driven and occurred over a long period of time. Bare soil and erosion pavement were present, but current plant and litter cover was well distributed and appeared to be preventing erosion. All herbaceous plants in the allotment, including natives, were vigorous and reproducing but uplands remain susceptible to widespread juniper encroachment.

Parsnip

Riparian

Reach 331 on the Little Parsnip Creek was rated as functional-at-risk in its entirety. However, if the reach was divided in half the upper and lower ends would deserve distinct ratings due to the differences in management and condition. The upper section of the stream, just below the headwaters spring is non-functioning. In the wet meadow just downstream, range condition scores were satisfactory and in an upward trend because the site had a low percentage of bare soil and was dominated by late seral vegetation. But just beyond the wet meadow early seral species dominated and streambank disturbance and trampling was widespread. Recruitment of woody riparian species was lacking and riparian overstory vegetation consisted primarily of juniper and wild rose although old growth ponderosa pines were represented as well. In contrast, the lower section of the stream was in proper functioning condition. Woody riparian species as

well as late-seral herbaceous plants were common. As access to the stream channel became more difficult, vegetation became dense and understories shifted from European pasture grasses and forbs to communities dominated by sedges and rushes (Jackson, 2012).

Reach 325 on the Parsnip Creek was in proper functioning condition. Riparian vegetation was in mid- to late-seral status (an upward trend from early-seral status in 2000). Woody riparian species such as dogwoods and willows displayed a good distribution of age-classes and high vigor (Jackson, 2012).

NRCS studies of associated wet meadow habitat indicated that species composition was generally as expected on applicable sites. Perennial graminoids dominated, were vigorous, and were present in expected amounts and distributions. Presence of invasive species was minimal and did not appear to be impairing site function. Some soil hummocking was noted as a result of livestock impacts, but neither bare ground nor erosion features appeared excessive (Jackson, 2012).

Date	Site	Vegetation Condition	Overall Condition	Vegetation Trend	Overall Trend
8/6/2003	wet meadow	moderate	moderate		
7/13/2008	wet meadow	high	High	Up	up

Table 22: Range condition scores for the Parsnip Allotment.

Upland

Upland vegetative production and reproduction appeared vigorous. Herbaceous species included blue wild rye, bottlebrush squirrel tail, bulbous bluegrass, California oatgrass (*Danthonia californica*), cheatgrass, Idaho fescue, Kentucky blue grass, giant ricegrass, Sandberg bluegrass, and soft chess (*Bromus hordeaceous*). Upland browse species included antelope bitterbrush, and mountain mahogany. Overstory species included ponderosa pine, young white fir, and western juniper.

While the allotment has been rested for several years, it has not been rested in its entirety. Livestock are trailed through the allotment from the West Valley Allotment to the Blue Lake Allotment, and incidental forage use has occured (Figure 9) (Jackson, 2012).

On a dry upland site adjacent to the livestock trail in the South Pasture, bare soil was 14% of the ground cover and erosion pavement was 3%. Litter, rock and live vegetation provided 28%, 0%, and 55% of the ground cover respectively. Perennial grass species including bluebunch wheatgrass, bottlebrush squirrel tail, Idaho fescue, and Lemon's needle grass formed 56% of the species composition followed by species such as lupine, annual forbs, and Kentucky bluegrass (40%), and encroaching juniper (4%). Juniper cover was 22% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately a 50/50 mix).

Figure 9: Adjacent to the Livestock Trail

On a mesic upland site above Parsnip Creek in the South Pasture, bare soil was 8% of the ground cover. Litter, rock and live vegetation provided 8%, 26%, and 58% of the ground cover respectively. Juniper cover was 7% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately a 40/60 mix). Perennial grasses including bottlebrush squirrel tail, Idaho fescue, and Sandberg bluegrass formed 60% of the species composition followed by species including annual and perennial forbs (40%).

NRCS studies of perennial grassland, big sage, and mountain sage communities appeared relatively consistent with the above findings. Species present were largely expected for the site and occurred in appropriate proportions. The biggest concern was the presence of exotic annual grasses like cheatgrass and Japanese brome, but neither of those species appeared to dominate any of the surveyed sites. Juniper encroachment was also a factor and tended to be associated with higher levels of bare ground in the allotment.

While the uplands appear to be functioning overall and active rill and gully erosion were not observed on the allotment, signs of historic erosion do exist. Many mature perennial grasses were pedestalled and the "A" horizon, while present, appeared fragmented. It's likely soil loss was wind-driven and occurred over a long period of time. Bare soil was present (8-14%), but not excessive, and current plant and litter cover were well distributed across the allotment and appeared to be protecting soils on the site. Native forage plants were vigorous and reproducing, and dominated most sites. While there weren't indications that livestock trailing was having a discernible effect on the uplands, juniper encroachment appeared widespread.

3.1.4 Environmental Consequences

Methodology and Spatial / Temporal Context for Effects Analysis

This analysis addresses effects on rangelands using information collected at key areas and representative ecological sites within the allotments. The potential effects of the management alternatives on rangeland resources were evaluated using Modoc National Forest Land and Resources Management Plan (LRMP) direction and Standards and Guidelines (S&G), as amended. Management that is consistent with S&G is more likely to result in achievement or progress towards desired resource conditions across the landscape. Evaluation criteria

specifically address upland and riparian range conditions, utilization standards, and the ability of each alternative to sustain grazing opportunities on authorized lands.

Evaluation criteria were assessed and compared for each alternative in Table 23. This assessment was a qualitative estimator based on past experiences, observations and monitoring data. For each alternative, a numerical rank was assigned to ecological indicators that evaluate the anticipated probability of meeting given Forest direction.

- A ranking of "1" represents a low expected likelihood of meeting Forest goals for standards and desired conditions over either the short- or long-term;
- a ranking of "2" represents an expected likelihood of complying with Forest direction over the long-term; and
- a ranking of "3" represents an expected likelihood of complying with Forest direction over the short-term.

Time frames are projected out from the date of implementation of the decision. Short-term effects represent impacts that occur year to year, or for this analysis, across a time-span of up to five years. Long-term effects, for this analysis, will represent resource impacts that occur across timeframes of five years or more.

Indicators	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Predicted Ability to Consistently Meet Standards Across All Upland Key Areas	2	3	1	3	3
Predicted Ability to Consistently Meet Standards Across All Riparian Key Areas	2	3	3	3	3
Predicted Ability to Meet Satisfactory Upland Range Condition and Trend Objectives	2	2	1	1	2
Predicted Ability to Meet Satisfactory Riparian Range Condition and Trend Objectives	2	2	3	2	2

Table 23: Expected Grazing Effects On Ecological Indicators By Management Alternative.

A comparison of potential effects on livestock grazing is provided in Table 24: Expected Effects of the Management Alternatives on Livestock Grazing. Alternatives were assigned numerical values (1-5) based on their predicted ability to maximize grazing opportunities in the future. A rank of "5" represents the most potential opportunity.

Indicators	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**
Predicted Ability to Maximize Grazing Opportunities on All Allotments	1	3	5	2	4

Table 24: Expected Effects of the Management Alternatives on Livestock Grazing.

3.1.4.1 Alternative 1 – No Grazing/No Action

Direct Effects and Indirect Effects

Alternative 1 would discontinue livestock grazing on the allotments. It is expected that all range standards and guidelines would be met under this alternative. Alternative 1 would likely address resource objectives by maintaining satisfactory range condition, as well as result in the improvement of unsatisfactory conditions where they exist. This alternative would not provide sustainable livestock grazing opportunities to interested members of the public.

It is likely that standards and guidelines for forage utilization would be achieved under a no grazing alternative because livestock would not remove any vegetation from the allotments. Some historic upland disturbance may recover slowly regardless of grazing pressure, but the dominance of satisfactory conditions across the allotments indicates that rangelands would continue to meet or make progress towards desired ecological conditions.

The Parsnip Allotment has not been grazed for the last several years (except for some use as a result of seasonal livestock trailing); therefore upland conditions on that allotment are reflective of a "no-grazing" scenario. Plant species composition and functional groups in the Parsnip Allotment are generally those expected for the site, and signs of accelerated erosion were not observed. Because ground cover and species composition (including exotic plants) on the Outlet and West Valley Allotments were similar to those on the Parsnip Allotment, current conditions are expected to persist under a no-grazing alternative.

The greatest anticipated effect of the no action alternative would be the improvement of riparian, seep and adjacent meadow conditions in all three allotments. The selective pressures of concentrated use or preferential grazing can begin to favor early-seral and disturbance indicator species over time. When wetland and riparian habitat is grazed heavily, even to a poor condition, reducing or removing livestock grazing can lead to quick recovery, therefore, the removal of livestock could encourage establishment of mid- and late-seral herbaceous species, recruitment of woody riparian species, and overall restoration of disturbed riparian areas.

Reach 311 on the South Fork Pit River (Outlet allotment) would likely continue on an upward trend over the short-term while improvements in channel morphology take place over the long-term. Also in the Outlet Allotment, Reach 312 would maintain its proper functioning condition status, and Reach 313 would likely see short-term improvement in its seral status. Stream morphology of Reach 313 would likely improve over the long-term.

In the Parsnip Allotment, an end to livestock trailing would likely allow stream vegetation along the upper reaches of Little Parsnip Creek to improve in the short-term. Seral status would likely progress as herbaceous and woody riparian species re-establish along the upper half of the stream. Physical stream attributes would likely improve over the long-term. No grazing would likely allow continued improvement on Parsnip Creek as well, which improved from early to mid/late seral condition over eight years of reduced grazing pressure (on both the Parsnip and West Valley Allotments).

In the West Valley Allotment, removal of grazing would protect meadow and fen sites from potential future disturbance. No grazing would allow vegetation succession to occur naturally on meadows in the West Valley Springs area. Aside from possible benefits to vegetation, removal of grazing would also prevent trampling of the fen on road 39N19 and exposure of its peat substrate.

Cumulative Effects

Past, present and reasonably foreseeable actions in the vicinity include on-going dispersed recreation use, and juniper management activities. Mechanical removal of western juniper has occurred and opportunities for further treatment have been identified in the allotments. Because no adverse direct or indirect effects on range resources are anticipated, adverse cumulative effects are not likely to occur as a result of Alternative 1. However, this alternative would not help provide sustainable grazing opportunities to local ranchers.

3.1.4.2 Effects Common to Alternative 2, 3, 4 & 5

Direct Effects and Indirect Effects

Riparian juniper treatment:

The purpose of the felling of juniper that do not exhibit old growth characteristics on 88 acres of the S. Fork Pit River (Reach 313), 37 acres of the Unnamed Stream in the West Valley Allotment, and 157 acres of Little Parsnip Creek (Reach 331) is to create livestock barriers to prevent impacts on the riparian areas. This would allow both of these reaches that are rated as functioning-at-risk in a downward trend to rehabilitate and move towards desired conditions.

Fen:

The construction of a fence around the fen, about 1/10 of an acre in extent, located in the West Valley Allotment off the main road (39N19) would prevent the trampling that has been occurring. This would allow it to maintain riparian vegetative structure and reduce potential future disturbance.

Archaeological sites:

There are two archaeological sites located within the project areas that were identified with potential impacts from livestock grazing. One is located in the Outlet Allotment and the other site is located in the Parsnip Allotment. Under the provisions of Attachment 2 of the National Programmatic Agreement for Rangeland (1995), III.C.2c these sites would be monitored for three years and based on the monitoring information it is possible these sites would be fenced. Short term actions may be used to reduce livestock effects, such as change in trail routes, change in grazing system, salting, and use of riders.

Cumulative Effects

Past, present and reasonably foreseeable actions in the vicinity include past juniper treatments and timber sales, on-going dispersed recreation use, firewood gathering, wildfire suppression, special use permits, and invasive plant management.

Juniper reduction to enhance sage-steppe habitat has occurred on both private land adjacent to and within the analysis area; three USFS projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and West Valley Mechanical Juniper Thinning Project (in 2005) and Outlet/West Valley Range Forage Improvement (in 2008). In the treatment areas where the juniper was felled and left showed an increase in vegetation cover.

Timber harvest has occurred in the areas west of Blue Lake Ranch in the Upper portion of Parsnip Creek: Parsnip Basin Salvage (Commercial Thin and Sanitation in 1997), Parsnip Basin Salvage in 2000, and Blue Fire Forest Recovery Project (Fire Salvage in 2005 and 2006). This has provided more forage in the area.

Dispersed Recreation mainly occurs on the South Fork of the Pit River, which is in the Outlet Allotment and will have no effect on grazing.

Firewood gathering adjacent to transportation systems was observed where past juniper treatment has occurred. Private woodcutting activities may increase as felled and piled juniper becomes available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other off-highway vehicle (OHV) use may scare the livestock into other areas.

The Invasive plants may be treated with either herbicide or hand grubbing according to the Modoc National Forest Noxious Weed Treatment Project standards and guidelines. Treatments are typically small in size and carefully prescribed to minimize potential impacts. Treating invasive species may help the forage base in the area and prevent invasive species from further displacing forage plants.

Road maintenance activities have little to no effect on grazing. The machinery could temporarily displace livestock for a brief time (usually less than one hour). It is not likely to displace them into areas they can't already access.

Fire suppression, is not expected to have an effect, since the suppression activities currently contain policy to restore any Forest Service structures damage by suppression activities. Effects of grazing with fires are addressed in the Fire/Fuels specialist report.

There are Special Use Permits (Surprise Valley Electric, Opal Mines, and irrigation ditch) within the analysis area. No conflict is expected, no effect is expected.

3.1.4.3 Alternative 2-Proposed Action

Direct and Indirect Effects

The South Warner Grazing EA Proposed Action involves re-authorizing grazing while reducing livestock on the West Valley Allotment and implementing the Sage Steppe Restoration Strategy to decrease the juniper encroachment.

Under this alternative, grazing would be re-authorized for ten years and the Allotment Management Plans (AMP) would be revised on the Outlet, West Valley, and Parsnip Allotment. This action would provide sustainable livestock grazing opportunities to interested members of the public.

Based on analysis of monitoring data, utilization data and actual use reports collected by Modoc National Forest resource specialists, the Forest proposes to re-authorize livestock grazing within the three allotments with the following maximum Head Months (HMs) and Animal Unit Months (AUMs). The use is displayed in the following Table .

Allotment	Head Months (HM)/Animal Unit Months (AUMs)Permitted	Current HMs/AUMs	Proposed HMs/AUMs	Capable AUMs
Outlet	432/570	432/570	432/570	645
West Valley	632/834	281/371	281/371	506
Parsnip	226/298	226/298	226/298	524

Table 25: Current and Proposed HMs and AUMs, Alternative 2.

The current permitted Head Months (HMs) and Animal Unit Months (AUM) on Outlet and Parsnip Allotments would remain the same but the West Valley Allotment would be reduced to reflect the current HMs and AUMs grazing on the allotment. It is likely that standards and guidelines for forage utilization would still be achieved with this alternative with the current HMs and AUMs. Past actual use data has indicated that the West Valley Allotment range readiness has been ready later and the livestock removal is earlier than its season of use by meeting utilizations. Therefore, if the additional livestock numbers were increased on the allotment the season of use would be much shorter.

The West Valley Allotment falls within the Sage Steppe Restoration Strategy focus area. The activities proposed are falling, lopping and scattering of juniper (that does not exhibit old growth characteristics) would occur on 1364 acres of the West Valley Allotment, in the upland areas. Also, piling and burning and utilization of juniper trees, will occur to prevent severe fuel loading. The purpose of the Sage Steppe Restoration Strategy is to restore sage steppe ecosystems that have become dominated by Western juniper woodlands. The cause of the encroachment of Western juniper has been found to be due to severe domestic livestock grazing (late 1800's to the 1930's) and wildfire suppression. The livestock grazing altered the fire regime by reducing the fine fuels that carry fires in the mountain big sagebrush communities. There has been a decline in fires in this focus area allowing the young juniper to encroach.

Associated with the increase density of juniper are decreases in ground cover consisting of shrubs, grasses and forbs. This has reduced livestock forage availability and has been associated in reduction of livestock numbers. In the proposed Sage Steppe treatment area on West Valley Allotment the juniper woodland can be classified into three stages of successions, which two of the phases can be found. Phase II, trees are co-dominant with shrubs and herbs and all three vegetation layers influence the ecological processes and Phase III, trees are the dominant vegetation and the primary plant influencing ecological processes.

Areas in Phase II juniper trees co-dominant to transition to sagebrush grassland, most trees have to be removed and if adequate seed source of herbaceous and shrubs must be present in order to have sagebrush grassland. Re-treatment occurs 15-25 years later to remove seedling junipers and saplings that are usually missed. Areas in Phase III, trees dominant to transition to grassland the method is to remove all trees and use fire to control remaining live trees. Treatment usually allows early succession communities dominated by forbs and grasses.

The area that is treated would have a mandatory two years of rest from livestock grazing and this would be necessary to achieve sage steppe restoration goals. This would allow reestablishment of sage steppe vegetation, including prevention of non-native weed species; and creating adequate understory for fire use. The rest would allow the newly established grass and forb species become vigorous with adequate crown and root structure. The rest may have consequences to the livestock permittee. The Forest Service would seek opportunities to minimize the impacts on the grazing permittee such as: design of project to minimize rest on non-treated area, use vacant sheep/cattle allotments for displaced livestock, development of other forms of "grassbanks", and holding of permits voluntarily returned or acquired for the displaced livestock. If no alternative can be found it is possible the livestock permittee may have to reduce herd sizes during the duration of rest and restoration treatment. By removing the juniper this would result in an upward trend in range quality based on the amount of acres restored. With the West Valley area being in different phases of juniper the amount of forage produced would vary.

Cumulative Effects

Past, present and reasonably foreseeable actions in the vicinity include past juniper treatments and timber sales, on-going dispersed recreation use, firewood gathering, wildfire suppression, special use permits, and invasive plant management.

Juniper reduction to enhance sage-steppe habitat has occurred on both private land adjacent to and within the analysis area; three USFS projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and West Valley Mechanical Juniper Thinning Project (in 2005) and Outlet/West Valley Range Forage Improvement (in 2008). In the treatment areas where the juniper was felled and left showed an increase in vegetation cover.

Timber harvest has occurred in the areas west of Blue Lake Ranch in the Upper portion of Parsnip Creek: Parsnip Basin Salvage (Commercial Thin and Sanitation in 1997), Parsnip Basin Salvage in 2000, and Blue Fire Forest Recovery Project (Fire Salvage in 2005 and 2006). This has provided more forage in the area.

Dispersed Recreation mainly occurs on the South Fork of the Pit River, which is in the Outlet Allotment and will no effect on grazing.

Firewood gathering adjacent to transportation systems was observed where past juniper treatment has occurred. Private woodcutting activities may increase as felled and piled juniper becomes available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other OHV use may scare the livestock into other areas.

The Invasive plants may be treated with either herbicide or hand grubbing according to the Modoc National Forest Noxious Weed Treatment Project standards and guidelines. Treatments are typically small in size and carefully prescribed to minimize potential impacts. Treating invasive species may help the forage base in the area and prevent invasive species from further displacing forage plants.

Road maintenance activities have little to no effect on grazing. The machinery could temporarily displace livestock for a brief time- usually less than one hour. It is not likely to displace them into areas they can't already access.

Fire suppression, is not expected to have an effect, since the suppression activities currently contain policy to restore any Forest Service structures damage by suppression activities. Effects of grazing with fires are addressed in the Fire/Fuels specialist report.

There are Special Use Permits (Surprise Valley Electric, Opal Mines, and irrigation ditch) within the analysis area. No conflict is expected, no effect is expected.

3.1.4.4 Alternative 3- Implement Sage Steppe Restoration & Keep All Permitted Head Months

Direct and Indirect Effects

The difference between Alternative 2 and Alternative 3 is the livestock numbers on the West Valley Allotment. In this Alternative the proposal is to keep the permitted 632 HMs/834 AUMs (Table). This would be an increase in livestock numbers on the West Valley Allotment because the entire permitted numbers have not grazed on the allotment for numerous years.

Allotment	Head Months (HM)/Animal Unit Months (AUMs)Permitted	Current HMs/AUMs	Proposed HMs/AUMs	Capable AUMs
Outlet	432/570	432/570	432/570	645
West Valley	632/834	281/371	632/834	506
Parsnip	226/298	226/298	226/298	524

Table 26: Current and proposed HMs and AUMs, Alternative 3.

The West Valley Allotment falls within the Sage Steppe Restoration Strategy focus area. The activities proposed are falling, lopping and scattering of juniper (that does not exhibit old growth characteristics) would occur on 1364 acres of the West Valley Allotment, in the upland areas. Also, piling and burning and utilization of juniper trees, will occur to prevent severe fuel loading. The increase in permitted numbers may not meet standards and guidelines by exceeding utilizations, with not enough forage to sustain the livestock for the season of use.

The area that is treated would have a mandatory two years of rest from livestock grazing and this would be necessary to achieve sage steppe restoration goals. This would allow reestablishment of sage steppe vegetation, including prevention of non-native weed species; and creating adequate understory for fire use. The rest would allow the newly established grass and forb species become vigorous with adequate crown and root structure. The rest may have consequences to the livestock permittee. The Forest Service would seek opportunities to minimize the impacts on the grazing permittee such as: design of project to minimize rest on non-treated area, use vacant sheep/cattle allotments for displaced livestock, development of other forms of "grassbanks", and holding of permits voluntarily returned or acquired for the displaced livestock. If no alternative can be found it is possible the livestock permittee may have to reduce herd sizes during the duration of rest and restoration treatment. By removing the juniper this would result in an upward trend in range quality based on the amount of acres restored. With the West Valley area being in different phases of juniper the amount of forage produced would vary.

Cumulative Effects

Past, present and reasonably foreseeable actions in the vicinity include past juniper treatments and timber sales, on-going dispersed recreation use, firewood gathering, wildfire suppression, special use permits, and invasive plant management.

Juniper reduction to enhance sage-steppe habitat has occurred on both private land adjacent to and within the analysis area; three USFS projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and West Valley Mechanical Juniper Thinning Project (in 2005) and Outlet/West Valley Range Forage Improvement (in 2008). In the treatment areas where the juniper was felled and left showed an increase in vegetation cover.

Timber harvest has occurred in the areas west of Blue Lake Ranch in the Upper portion of Parsnip Creek: Parsnip Basin Salvage (Commercial Thin and Sanitation in 1997), Parsnip Basin Salvage in 2000, and Blue Fire Forest Recovery Project (Fire Salvage in 2005 and 2006). This has provided more forage in the area.

Dispersed Recreation mainly occurs on the South Fork of the Pit River, which is in the Outlet Allotment and will no effect on grazing.

Firewood gathering adjacent to transportation systems was observed where past juniper treatment has occurred. Private woodcutting activities may increase as felled and piled juniper becomes available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other OHV use may scare the livestock into other areas.

The Invasive plants may be treated with either herbicide or hand grubbing according to the Modoc National Forest Noxious Weed Treatment Project standards and guidelines. Treatments are typically small in size and carefully prescribed to minimize potential impacts. Treating invasive species may help the forage base in the area and prevent invasive species from further displacing forage plants.

Road maintenance activities have little to no effect on grazing. The machinery could temporarily displace livestock for a brief time- usually less than one hour. It is not likely to displace them into areas they can't already access.

Fire suppression, is not expected to have an effect, since the suppression activities currently contain policy to restore any Forest Service structures damage by suppression activities. Effects of grazing with fires are addressed in the Fire/Fuels specialist report.

There are Special Use Permits (Surprise Valley Electric, Opal Mines, and irrigation ditch) within the analysis area. No conflict is expected, no effect is expected.

3.1.4.5 Alternative 4-NoSage Steppe Restoration &Reduce West Valley Head Months

Direct and Indirect Effects

Alternative 4 would reduce livestock numbers to the current usage in the West Valley Allotment with no Sage Steppe restoration strategy (Table). The reduction in numbers would facilitate grazing levels per LRMP, when adhered to, have proven effective for maintaining and restoring riparian function. The direct and indirect effects will be the same as Alternative 2 with reducing the numbers in the West Valley Allotment.

Allotment	Head Months (HM)/Animal Unit Months (AUMs)Permitted	Current HMs/AUMs	Proposed HMs/AUMs	Capable AUMs
Outlet	432/570	432/570	432/570	645
West Valley	632/834	281/371	281/371	506
Parsnip	226/298	226/298	226/298	524

Table 27: Current and Proposed HMs and AUMs, Alternative 4.

By continuing to allow the encroachment of Western junipers on the West Valley Allotment, the forage production would continue to decrease and the possibility of future reduction of livestock numbers may occur. The benefit of herbaceous cover would not increase without the juniper reduction.

Cumulative Effects

Past, present and reasonably foreseeable actions in the vicinity include past juniper treatments and timber sales, on-going dispersed recreation use, firewood gathering, wildfire suppression, special use permits, and invasive plant management.

Juniper reduction to enhance sage-steppe habitat has occurred on both private land adjacent to and within the analysis area; three USFS projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and West Valley Mechanical Juniper Thinning Project (in 2005) and Outlet/West Valley Range Forage Improvement (in 2008). In the treatment areas where the juniper was felled and left showed an increase in vegetation cover.

Timber harvest has occurred in the areas west of Blue Lake Ranch in the Upper portion of Parsnip Creek: Parsnip Basin Salvage (Commercial Thin and Sanitation in 1997), Parsnip Basin Salvage in 2000, and Blue Fire Forest Recovery Project (Fire Salvage in 2005 and 2006). This has provided more forage in the area.

Dispersed Recreation mainly occurs on the South Fork of the Pit River, which is in the Outlet Allotment and will no effect on grazing.

Firewood gathering adjacent to transportation systems was observed where past juniper treatment has occurred. Private woodcutting activities may increase as felled and piled juniper becomes available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other OHV use may scare the livestock into other areas.

The Invasive plants may be treated with either herbicide or hand grubbing according to the Modoc National Forest Noxious Weed Treatment Project standards and guidelines. Treatments are typically small in size and carefully prescribed to minimize potential impacts. Treating invasive species may help the forage base in the area and prevent invasive species from further displacing forage plants.

Road maintenance activities have little to no effect on grazing. The machinery could temporarily displace livestock for a brief time- usually less than one hour. It is not likely to displace them into areas they can't already access.

Fire suppression, is not expected to have an effect, since the suppression activities currently contain policy to restore any Forest Service structures damage by suppression activities. Effects of grazing with fires are addressed in the Fire/Fuels specialist report.

There are Special Use Permits (Surprise Valley Electric, Opal Mines, and irrigation ditch) within the analysis area. No conflict is expected, no effect is expected.

3.1.4.6 Alternative 5 – Implement Sage Steppe Restoration Strategy & propose 506 Head Months on West Valley Allotment

This Alternative is similar to Alternative 2 and 3 except the maximum permitted numbers would be 506 Head Months after the two years of rest from the juniper treatment. The Head Months for

this alternative or based on data from the dominant vegetation layer in GIS for the West Valley Allotment. The vegetation layer provides an average forage production for the various vegetation types. The permittee will be allowed to run full permitted numbers but once season of use or allowable utilization standards are met he will have to come off the allotment. The allowable utilization standards will remain the same as stated in Alternative 2 and 3.

Allotment	Head Months (HM)/Animal Unit Months (AUMs)Permitted	Current HMs/AUMs	Proposed HMs/AUMs	Capable AUMs
Outlet	432/570	432/570	432/570	645
West Valley	632/834	281/371	506/670	506
Parsnip	226/298	226/298	226/298	524

Table 28: Current and Proposed HMs and AUMs, Alternative 5.

Cumulative Effects

Past, present and reasonably foreseeable actions in the vicinity include past juniper treatments and timber sales, on-going dispersed recreation use, firewood gathering, wildfire suppression, special use permits, and invasive plant management.

Juniper reduction to enhance sage-steppe habitat has occurred on both private land adjacent to and within the analysis area; three USFS projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and West Valley Mechanical Juniper Thinning Project (in 2005) and Outlet/West Valley Range Forage Improvement (in 2008). In the treatment areas where the juniper was felled and left showed an increase in vegetation cover.

Timber harvest has occurred in the areas west of Blue Lake Ranch in the Upper portion of Parsnip Creek: Parsnip Basin Salvage (Commercial Thin and Sanitation in 1997), Parsnip Basin Salvage in 2000, and Blue Fire Forest Recovery Project (Fire Salvage in 2005 and 2006). This has provided more forage in the area.

Dispersed Recreation mainly occurs on the South Fork of the Pit River, which is in the Outlet Allotment and will no effect on grazing.

Firewood gathering adjacent to transportation systems was observed where past juniper treatment has occurred. Private woodcutting activities may increase as felled and piled juniper becomes available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other OHV use may scare the livestock into other areas.

The Invasive plants may be treated with either herbicide or hand grubbing according to the Modoc National Forest Noxious Weed Treatment Project standards and guidelines. Treatments are typically small in size and carefully prescribed to minimize potential impacts. Treating

invasive species may help the forage base in the area and prevent invasive species from further displacing forage plants.

Road maintenance activities have little to no effect on grazing. The machinery could temporarily displace livestock for a brief time- usually less than one hour. It is not likely to displace them into areas they can't already access.

Fire suppression, is not expected to have an effect, since the suppression activities currently contain policy to restore any Forest Service structures damage by suppression activities. Effects of grazing with fires are addressed in the Fire/Fuels specialist report.

There are Special Use Permits (Surprise Valley Electric, Opal Mines, and irrigation ditch) within the analysis area. No conflict is expected, no effect is expected.

3.2 Botany

3.2.1 Introduction

Rare plant species whose viability is of concern to the Forest Service are listed by each region in a list of sensitive species. The goal is to avoid impacts to sensitive species that may cause them to be listed as threatened or endangered under the Endangered Species Act.

3.2.2 Scope of Analysis, Methodology, and indicators

The analysis area for botanical resources is the three allotments, with special focus on a newly discovered fen, areas with known occurrences of sensitive plant species, and proposed juniper treatments.

Analysis began by checking Modoc N.F. botanical records and the California Natural Diversity Database for known rare plants or habitats within the three allotments. Floristic, intuitively controlled botany surveys were then conducted by Modoc NF botany survey staff trained to identify local Sensitive plants and habitats during the summer of 2011, with a few minor additional surveys taking place in the summer of 2013. Survey methodology was intuitive controlled, meaning that the survey consisted of a walk-through of the area seeking potential habitats for rare plants or noxious weeds; once potential habitats were identified, they were investigated to see whether rare plants or noxious weeds occurred within them or not.

3.2.3 Affected Environment

Two ESA-listed plant species occur on the Modoc National Forest: the vernal pool grasses *Orcuttia tenuis* and *Tuctoria greenei*. No habitat for either of these species exists in the analysis area.

Of botanical interest within the three allotments are a fen in West Valley Allotment and seven sites of the Region 5 Sensitive plant species, *Astragalus pulsiferae* var. *coronensis*. Most of these sites border or are within the proposed 1,364 ac. West Valley juniper treatments in Alternatives 2, 3, and 5.

Astragalus pulsiferae var. *coronensis* is a small perennial herb in the Fabaceae, the bean family. It is endemic to Modoc and Lassen counties, growing in dry, sandy or gravelly volcanic soils, on flats or gentle slopes, often within open pine woodlands, or sagebrush juniper scrub

(Wojciechowski & Spellenberg 2012). The seven sites on this project comprise nearly half of the sixteen known Forest-wide, although several large sites also occur on BLM and private lands throughout Ash Valley. Given the limited distribution of this endemic, these seven sites represent important populations for this subspecies' conservation. CNPS (2014) notes that grazing and trampling are potential threats.

A fen was discovered on West Valley allotment, surveyed, and determined to be habitat for the sensitive *Botrychium* spp., *Meesia* spp., and *Helodium blandowii*, although no individuals of any of these species were discovered. The spongy, wet soils of fens are unusual habitats in the mostly xeric Modoc Plateau and host several rare species such as these; in addition to simple natural rarity, livestock grazing throughout the Warner Mountains constitute a trampling threat to the continued survival and reproductive capacity of these plants. Fens are usually associated with springs, and are perennially wet features covered by a mound of vegetation rooted in organic soils, the soil having been created by older fen vegetation which has died. Except for extremely dry years, these fens feature lush green vegetation, which makes them attractive to livestock, as well as perennially soft, moist soils, which makes them particularly vulnerable to adverse trampling effects from heavy cattle. The fen in West Valley, the only such habitat yet discovered within the three allotments, is circled by a narrow ring of trampled soil created by hooves.

Besides *Astragalus pulsiferae* var. *coronensis* sites and the fen, neither occurrences of nor potential habitat for any other Region 5 Sensitive plant species were found on any of the three allotments.

Noxious weeds also exist on this allotment: spotted and diffuse knapweeds, yellow star-thistle, Canada thistle, Klamathweed, Scotch thistle, Mediterranean sage, and Medusahead rye.

3.2.4 Environmental Consequences

3.2.4.1 Alternative 1

Direct and Indirect Effects

Under the no action alternative, *Astragalus pulsiferae* var. *coronensis* sites would suffer no direct impacts from cattle grazing, juniper treatments, or fence construction. When contrasted with alternatives 2, 3, and 5, possible indirect effects to sensitive plant sites could include increasing competition from western juniper trees, and alteration of site habitat due to higher-intensity fire. The cessation of grazing could be a beneficial indirect effect, although given that the analysis of the action alternatives based on monitoring data shows there to be little adverse direct impact due to grazing at present, the benefit to sensitive plants of ending grazing would be correspondingly minor.

Preliminary observations suggest that all sites in this area in decline due to widespread invasions of nonnative annual grasses, particularly Medusahead (*cf.* D'Antonio & Vitousek 1992), and possibly to increasing density of western juniper as well (Bates *et al*. 2005, Coultrap *et al*. 2008). During monitoring of these populations in 2011, grazing impacts appeared secondary to the effects of competition from annual grasses and juniper.

Medusahead is a nonnative grass which competes with *Astragalus pulsiferae* var. *coronensis* for sun and water. Medusahead also alters the habitat by growing in thick thatch mats (Davies & Svejcar 2008), whereas the sensitive plant, which is endemic to gravelly, shallow, volcanic

outcrops in the vicinity of Ash Valley, has evolved with only light competition from the few, small, and scattered native plants that grow in the same habitat. The increased fine fuel biomass and fuel continuity resulting from nonnative grass invasion increase the risk to sensitive plants from fire (D'Antonio & Vitousek 1992). Although the present regime of cattle grazing is likely a significant contributing factor to the introduction of Medusahead in the first place (Davies 2008), the cessation of grazing would not likely ameliorate the present, invaded situation of the rare plant occurrences, since once established, Medusahead maintains itself indefinitely in the same location (Young *et al.* 2001, Norton *et al.* 2007, Kulmatiski & Beard 2008).

The fen in West Valley would not be fenced under this alternative. The removal of annual impacts by heavy cattle through cessation of grazing would serve the same purpose as fencing. Although other animals (wildlife) would continue to be able to access the fen, considering that fen species have co-evolved with the local wildlife over at least the past several thousand years, they would probably have little adverse effect. Alt. 1 would therefore have a beneficial effect on fen sensitive plant habitat.

Western juniper woodlands in West Valley allotment surround five of the seven known occurrences of horn milkvetch and are proposed for treatment in alternatives 2, 3, and 5. Without treatment, the woodlands may burn relatively rapidly, intensely, and as a single unit, causing a variety of adverse indirect impacts to the sensitive plant sites such as the promotion of competing early-seral vegetation in the aftermath of a hot fire, especially if retardant is used, or fireline goes through sites. Although western juniper does not grow as quickly or as densely in the sensitive plant habitat as it does in other nearby soils, fire remains a concern due to the annual grass invasion described above. Annual grasses can spread fire quickly, and increased density of nonnative annual grasses could occur, since increased nutrient availability following wildfire tends to favor annual grasses (Blank *et al*. 1996).

In summary: discontinuing livestock grazing would be of little benefit to known sensitive plant sites, and allowing the present juniper woodland to persist in its present state would pose more of a hazard to the sensitive plant sites than the proposed treatments in alternatives 2, 3, and 5.

Cumulative Effects

Past grazing and grazing management likely bears much responsibility for the presently invaded condition of the sites of *Astragalus pulsiferae* var. *coronensis* within the three allotments, as well as the less than ideal condition of the fen in West Valley; no other Forest activities are known to have occurred within those sites. The potential consequences of the foreseeable future action of fire suppression have already been addressed as potential indirect impacts. Over time, the cumulative effects of past actions combined with selection of Alt. 1 will be the continued existence of annual grasses and juniper densification in sensitive plant sites, with fires eventually removing junipers and promoting annual grasses at the expense of Astragalus pulsiferae var. coronensis. The cumulative effect of removing grazing entirely from the fen habitat would, however, improve that feature's suitability as sensitive fen plant species habitat.

3.2.4.2 Alternative 2

Direct and Indirect Effects

Cattle could trample *Astragalus pulsiferae* var. *coronensis* plants, eat them, or deposit feces on top of them. Given that cattle prefer grasses to forbs, that most individuals of this species are too

small for cattle to eat, and that the shallow, gravelly soils in which this species grows are relatively resistant to trampling disturbance, do not feature lush grass or present incentives for cattle to linger, the likelihood that continued authorized cattle grazing in roughly the same numbers as present, or slightly reduced, during the prescribed season of use, would directly adversely impact these occurrences is quite low. On the other hand, if a population is already declining due to other factors, even minor additional adverse impacts can hasten the decline and preclude recovery. While some herbivory of competing grasses by cattle could be beneficial, since the nonnative annual grasses are not particularly favored by cattle, the indirect benefit would be slight. Another possible indirect impact could be the introduction of novel nonnative plants by livestock.

Under this and all action alternatives, the fen in West Valley would be fenced. According to sensitive plant integrated design features, the fence would be placed outside the present boundary of the fen itself, which would prevent direct impacts to sensitive fen plant habitat as a result of installing fencing or as a result of authorized grazing. Indirect effects of restricting grazing in this fen would include the revegetation of the trampled and partially denuded path around the fen. Fen vegetation would have a greater opportunity to grow roots and rhizomes within the fen soils, which are integral to the composition of the fen itself. Although sensitive plant species were not recorded during surveys, if any are present but have been suppressed as a result of livestock grazing or trampling pressure, they would have an increased chance of recovery if fencing excludes cattle impacts from the fen, and thus this action would have a beneficial effect.

Direct impacts from juniper treatments in West Valley might include plant crushing if workers step on plants, trees or slash fall on them, or slash is dragged during removal from sensitive plant sites. Piling and burning juniper slash can burn plants and alter the soil to prevent regrowth of horn milkvetch and instead allow nonnative annual grasses or noxious weeds to thrive and produce plentiful seed within sensitive plant sites. These concerns are addressed in the Integrated Design Features for botany. If these design features are followed, the dangers from direct juniper treatment impacts would be much reduced.

In the long term, juniper treatment within these sites will help prevent increasing juniper densification and thus permit the site the full sun for which these sensitive plants have evolved. Beyond removing juniper competition for resources, treatments would also reduce the fuels within the sensitive plant sites. Reducing fuels would lessen the chance of high-intensity fire, which could alter soil chemistry in these uncommon habitats and render them unsuitable habitat for the rare plant species. A wildfire could also increase the density of nonnative annual grasses already present in the sites, since increased nutrient availability following wildfire tends to favor annual grasses.

This analysis contends that removing juniper fuels from sensitive plant sites, in full accordance with botany design features, would be a lesser adverse impact than the eventual burning of juniper stands that would occur if the stands were left untreated.

Cumulative Effects

Some ongoing forest activities, such as timber harvesting or road maintenance, are not likely to impact the sensitive plant sites, since they are not close to them. Other activities, such as permitted firewood gathering, dispersed recreation, or noxious weed treatments, are not known to be impacting sites. Juniper treatments in West Valley may reduce potential adverse

cumulative impacts of future fire suppression as the need for aggressive firefighting would be reduced as a result of selecting Alternative 2. Fencing the fen would exclude grazing in this and all other action alternatives and practically have the same cumulative effect on fen habitat as would Alt. 1.

3.2.4.3 Alternative 3

Direct and Indirect Effects
The direct and indirect effects of implementation of Alternative 3 would be very similar to those of Alt. 2. Increased cattle grazing in West Valley allotment would increase grazing presence and pressure on *Astragalus pulsiferae* var. *coronensis* populations and habitat. Although the increase in severity of impacts above the presently minor impacts is uncertain, it is probable, in view of the large infestations of unpalatable annual grasses, that impacts to rare plant habitat would increase out of proportion to the simple increase in grazing numbers, since competition for food among cattle is likely to increase, and forage is more frequently sought in areas of marginal productivity such as the sensitive plant habitat.

Cumulative Effects
The cumulative impacts of Alt. 3 would be similar to those of Alt. 2 in terms of reduced potential for impacts as a result of fire suppression, given the juniper reduction in West Valley. Increased grazing in sensitive plant sites, the logical result of increasing livestock numbers, will introduce more disturbance into those sites exacerbating existing infestations of nonnative annual grasses probably caused by past grazing actions.

3.2.4.4 Alternative 4

Direct and Indirect Effects
The direct and indirect impacts of cattle grazing under this alternative would be the same as those described in Alt. 2. Since juniper treatment would not occur around *Astragalus pulsiferae* var. *coronensis* in this alternative, the impacts of not treating juniper in West Valley allotment would be the same as those described in Alt. 1.

Cumulative Effects
The cumulative effects of Alternative 4 are similar to those for Alt. 1, in the potential for greater adverse impacts as a result of fire suppression than in Alternatives 2, 3, or 5.

3.2.5.5 Alternative 5

Direct and Indirect Effects
The direct and indirect effects of cattle grazing under this alternative would be intermediate between those of Alternatives 2 and 3: an increase in grazing may disproportionately increase cattle trampling impacts to sensitive plant sites. The direct and indirect effects of juniper treatment would be the same as those described in Alt. 2.

Cumulative Effects
The cumulative effects for Alternative 5 are similar to those of Alternative 3, in terms of effects due to increased grazing, although to a lesser degree. Since the juniper treatments are the same as those proposed under Alt. 2, the cumulative effects are the same as those described for Alt. 2.

3.3 Climate Change

3.3.1 Introduction

Global climate change is recognized as a process that can have effects on the human environment. However, because of the relatively small size of this project in the global climate context, a meaningful analysis of the actual effects of this project on the global climate is beyond the scope of this document.

Climate change can also have effects on the project area modifying the effects of the alternatives. In the Sierra Nevada, mean annual temperatures have generally increased by around 1 to 2.5 °F over the last 75 to 100 years[1]. Total annual precipitation has also trended upward while the proportion of precipitation falling as snow is declining. These changes in climate over the last century, combined with increasing forest fuels due to a century of fire suppression, seem to lead to increasing fire size, frequency, and severity over the last two to three decades[3].

The main ways that future climate change would affect the project area would be changes in fire regime and vegetation pattern. The warmer climate, CO_2 fertilization, and abundant shrubs that may vegetate the site would likely lead to increased fire severity and frequency in the future[3].

The warmer temperatures, even given the increased total annual precipitation, could result in slightly higher mortality of seedlings planted under the proposed action than the 65% survival predicted in the Silvicultural report.

3.3.2 Methodology

To estimate how future climate change could influence the vegetation within the analysis area, we first estimated the possible future climate change from current conditions and then related that to the typical vegetation now found on sites with that future climate as their current climate. The web-tool Climate Wizard[2] was used to estimate future climate change. Future climate change was estimated for 20 years from the present under medium emission scenarios. The "General Circulation Model Ensemble Average" was used to estimate future average annual precipitation change and average annual temperature change.

Once the departure from current conditions was calculated, a GIS tool, developed by USFS Region 5, was used to determine what typical vegetation now exists on National Forests within California that have average annual temperatures and precipitation equal to the future conditions predicted for the South Warner Grazing Analysis.

3.3.3 Results

The modal results from the model showed a drop in average annual precipitation of 32 millimeters and an increase in average annual temperature of 1.39 °C. The resulting average annual precipitation for the project area was 304.5 millimeters and an average annual

[1] **North, Malcolm, ed. 2012.** Managing Sierra Nevada Forests. Gen. Tech. Rep. PSW-GTR-237. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 184 p.
[2] www.climatewizard.org
[3] **Wrestling, A.L., Hildogo, H.G., Cayan, D.R., and Swetnam,T.W. 2006**. Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity

temperature of 8.39 °C. Using the GIS tool, 1 kilometer grid cells were located that currently have the climate that our Analysis Area may have in twenty years from now. These cells were found to have similar sage steppe vegetation types as our project area. Therefore, no significant changes in vegetation are predicted for the 20 year analysis horizon.

It should be noted that the methodology used here is a rather course filter approach. Climate models are unproven for long-term modeling. Another limitation is that current vegetation found at a site is influenced by many factors, not just average annual precipitation and temperature. However, this method may provide a good worst-case scenario to consider.

3.4 Economic and Social Analysis

3.4.1 Scope of the Analysis

The South Warner Grazing Environmental Assessment (EA) proposes to reauthorize the use of three allotments: Outlet, West Valley, and Parsnip Allotment. The Outlet Allotment and the north half of the West Valley Allotment is in Modoc County. The south half of the West Valley Allotment lies within Lassen County. Only a small corner of Parsnip Allotment is contained within Modoc County; the rest is in Lassen County (Figure 10). The economic and social analysis section of the EA captures the current condition of the population and the relation of public land to local economy. Trend analysis is performed when data is available. The data used in this section are publically available from various sources, including statistics from National Agriculture Statistical Service (NASS) database, the Economic Profile System-Human Dimensions Toolkit (EPS-HDT) and the Sage Steppe Ecosystem Restoration Strategy Final Environmental Impact Statement (USDA Forest Service, 2008).

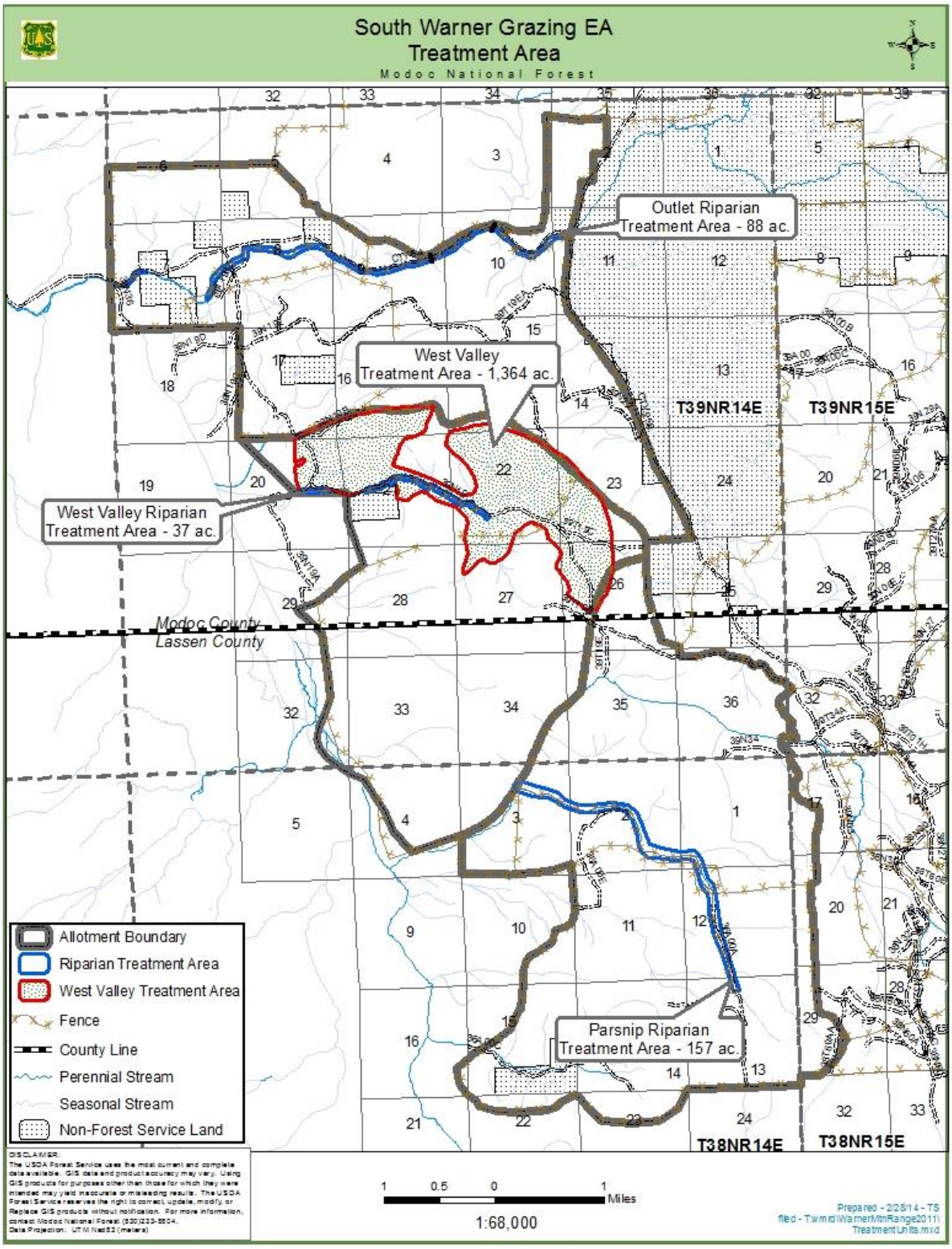


Figure 10. South Warner Project within the Counties

3.4.2 Affected Environment

Geographic location
Modoc County is located in the extreme northeastern corner of the California. The eastern border lies along the Nevada border; most of the northern border abuts Oregon. The County encompasses 1.93 million acres of land. It is one of the least densely populated counties in California with 2.3 people per square mile. Lassen County encompasses 2.17 million acres.

The area of the Modoc National Forest in Modoc County is 1,619,253 acres and 193,909 acres in Lassen County. In addition to Forest Service as a large land management agency, there are many other federal offices, including the Surprise and Alturas Bureau of Land Management Field Offices, a small portion of the Lava Beds National Monument, and Modoc National Wildlife Refuge. The current level of livestock production is related to and sometimes highly dependent on the allocation of federal lands.

With over 80 percent of Modoc County managed by the state and federal governments, many local land use decisions have the potential to affect private landowners, county government, and the local economy.[3] Only 9% of Lassen County is administered under Forest Service, therefore, this section will focus mainly on socioeconomic analysis in Modoc County.

Population
The population of Modoc County has remained nearly constant during the last 15 years. In 1990, the population was 9,600 (USDA Forest Service, 2008) and in 2012 the population was 9,650[4]. The county seat is in Alturas, which is the largest city in the county. There were 2,718 people inhabiting in the city of Alturas based on the latest census[5]. The population of the rest of the county resides in towns smaller than 1,000 people, within tribal lands, or on small private parcels scattered across the county.

Employment and income
The largest employer in the county is the government (federal, state and local), which accounts for 46% of total employment. The annual average wages from government sector is $40,561[6]. Natural resources and mining related employment opportunity is around 12.1%, with average annual wages being $30,079 in 2011. The per capita income in Modoc County is $34,946 in 2010, and there is a slight upward trend after 2000 (Table 29).

Table 29. Average Earning Per Job And Per Capital Income (1970-2011).

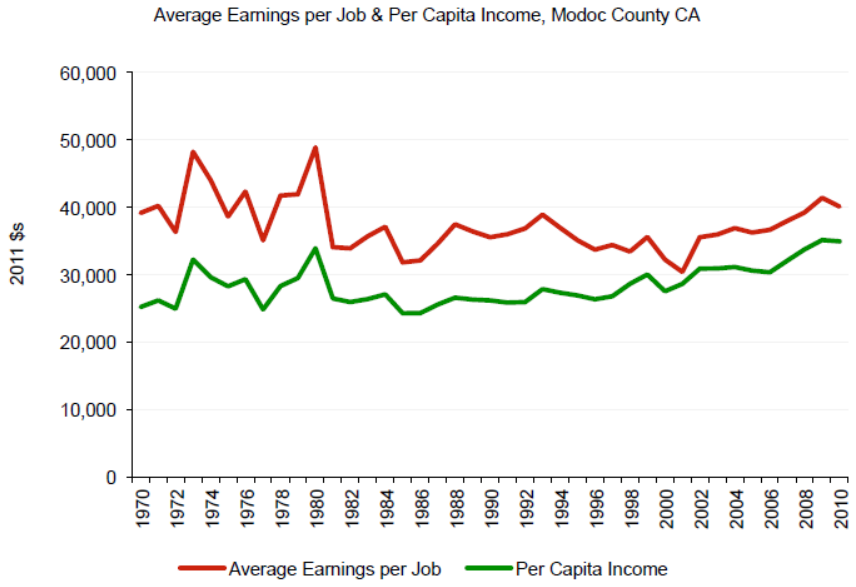
[3] Modoc County Land Use Committee http://biodiversity.ca.gov/newsletter/v9n2/modocluc.html
[4] http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic_files/2012/Modoc.pdf#zoom=65
[5] http://www.california-demographics.com/alturas-demographics
[6] http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic_files/2012/Modoc.pdf#zoom=65

Per Capita Income: This is a measure of income per person. It is total personal income (from labor and non-labor sources) divided by total population.

Average Earnings per Job & Per Capita Income, 1970-2010 (2011 $s)

	1970	1980	1990	2000	2010	Change 2000-2010
Average Earnings per Job	$39,163	$48,890	$35,576	$32,277	$40,122	$7,845
Per Capita Income	$25,244	$33,926	$26,207	$27,554	$34,946	$7,392
Percent Change						% Change 2000-2010
Average Earnings per Job						24.3%
Per Capita Income						26.8%

- From 1970 to 2010, average earnings per job grew from $39,163 to $40,122 (in real terms), a 2% increase.
- From 1970 to 2010, per capita income grew from $25,244 to $34,946 (in real terms), a 38% increase.



Unemployment records (based on people not working who were able, available, and actively seeking work between ages of 16 and 65 years old) from 1990 until 2003 show that unemployment has ranged from 7.6 percent to 13.5 percent (USDA, 2008). Unemployment was 14.9 percent in 2011[7] (Figure 10). The unemployment rate nearly doubled from 2000 to 2011.

Figure 11. Average Annual Unemployment Rate, 1990-2011.

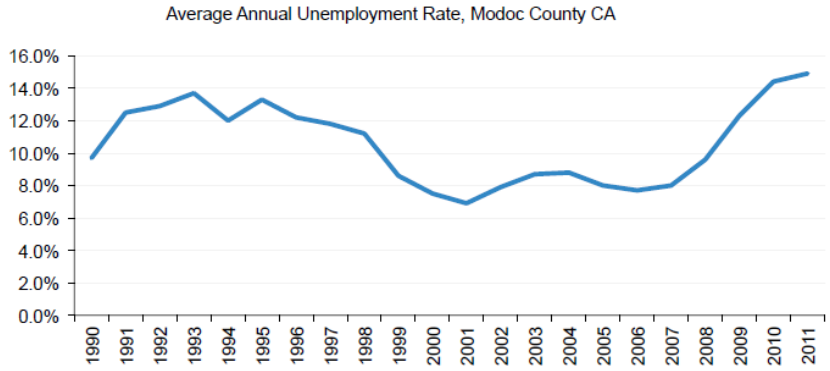
7 http://www.dot.ca.gov/hq/tpp/offices/eab/socio_economic_files/2012/Modoc.pdf#zoom=65

Unemployment Rate: The number of people who are jobless, looking for jobs, and available for work divided by the labor force.

Average Annual Unemployment Rate, 1990-2011

	1990	2000	2011	Change 2000-2011
Unemployment Rate	9.7%	7.5%	14.9%	7.4%

- Since 1990, the annual unemployment rate ranged from a low of 6.9% in 2001 to a high of 14.9% in 2011.



In 2011, total wage and salary employment decreased by 153 jobs in Modoc County, a decline of 5.6 percent. The non-farm sectors, which account for 87% of all jobs in the county, lost 169 jobs whereas the farm sector gained 18 jobs.

Local Economy

The local community is dependent on agricultural production, predominantly livestock management. The total income from farm related source has increased from 2002 to 2007. The number of farms has decreased slightly over this period of time, but the average income per farm was nearly doubled (Table 30).

Table 30. Total Income from Farm Related Source.

Year	**2002**	**2007**
Number of Farm	119	105
Total income from farm related source	1,593,000	2,582,000
Average per farm	13,384	24,592

The following table shows the personal income by industry and the trend between 2001 and 2010. Farm earning captures both livestock and crops. Farm earnings are defined as the net income of sole proprietors, partners and hired laborers arising directly from the current production of agricultural commodities. It includes net farm proprietors' income and the wages and salaries, pay-in-kind, and supplements to wages and salaries of hired farm laborers; but specifically excludes the income of farm corporations.

Noteworthy, the change of Farm related income between 2001 and 2010 is $33,513,000, which increased almost 5 fold. With more than 80 percent of the land in the county administered by the Forest Service, the actions taken by the Forest Service has a considerable amount of effect to local economy.

Personal Income by Industry, 2001-2010 (Thousands of 2011 $s)

	2001	2010	Change 2001-2010
Labor Earnings	142,993	181,751	38,759
Non-services related	*24,312*	*54,757*	30,445
Farm	6,732	40,245	33,513
Forestry, fishing, & related activities	*7,931*	6,488	-1,443
Mining (including fossil fuels)	*19*	*26*	7
Construction	8,919	*7,676*	-1,242
Manufacturing	713	*323*	-390
Services related	*48,561*	*42,333*	-6,228
Utilities	*2,800*	*2,471*	-329
Wholesale trade	7,282	4,972	-2,309
Retail trade	11,619	10,639	-980
Transportation and warehousing	*5,629*	*4,816*	-813
Information	987	*1,554*	567
Finance and insurance	2,125	2,279	154
Real estate and rental and leasing	3,514	1,310	-2,204
Professional and technical services	2,531	*4,173*	1,642
Management of companies and enterprises	0	0	0
Administrative and waste services	387	*895*	508
Educational services	*32*	*585*	553
Health care and social assistance	*na*	*na*	na
Arts, entertainment, and recreation	265	*na*	na
Accommodation and food services	2,802	*na*	na
Other services, except public administration	8,587	8,639	52
Government	65,706	74,044	8,338

Livestock Production

As Grazing is the foundation of the agriculturally based economy, the local economy is benefitted by the operations of these cattle ranches. Livestock production is the leading agriculture industry in Modoc County. Gross income from livestock and related production was approximately $18,894,000 in Modoc County in 2010. Currently, the total livestock permitted to graze on these three allotments is 610 cow/calf pairs. A calf can gain approximately 2 pounds a day. On an average for these three allotments a calf could gain approximately 125 pounds live weight. These three allotments could annually produce approximately 76250 pounds of beef worth approximately $164,700 in 2014, depending on the market price the month of the sale.

The 2011 federal grazing fee for Forest Service grazing permits is $1.35 per head month (HM). The Outlet, West Valley and Parsnip allotments are 3 of 118 Forest Service grazing allotments in Modoc and Lassen County and 27 on the Warner Mountain Ranger District. The permittees on these allotments are authorized a combined total of 610 cow/calf pairs with Term Grazing Permits for various season of use, ranging from May 1 through September 30. The permits are equivalent to 1290 Head Months. The Head Months generate $2, 297.70 to the Forest Service. Approximately 25% of grazing fees collected are returned from the U. S. Treasury to the local community for roads and schools.

A recent survey by the United States Department of Agriculture's National Agriculture Statistics Service (NASS) found that private, non-irrigated grazing fees per month (per cow/calf pair) in California averaged $21.00 in 2009 and $20.50 in 2010. The national average monthly fee per head averaged $17.50 in 2009 and $17.00 in 2010 (USDA, 2011).

To summarize, Modoc County being a rural county is heavily dependent on income generated from farm production, mainly livestock grazing. Forest Service actions on grazing allotment reauthorization have a direct effect to the local economy. The following section analyzes the project related cost and benefit both to Permittees and the Forest Service.

3.4.3 Environmental Consequences

3.4.3.1 DIRECT/INDIRECT/CUMULATUVE EFFECTS

This social and economic analysis addresses concerns that changing livestock levels would affect grazing related jobs and income. It also identifies how allotment improvements and changes in livestock management could affect costs to the permittees and the Forest Service.

This analysis did not evaluate the other costs such as livestock transport or maintenance and upkeep of ranch property. These are normal expenses by the ranch operators.

The federal government collects fees from ranchers, who graze National Forest System land (See Table 31 ** grazing fees received by the government row). The permittee is expected to maintain fences per their Term Grazing Permit. These fences and other improvements are owned by the government. Grazing fees, in part, help pay for these improvements; the remainder of the cost to administer, manage, and monitor allotments comes from congress. In addition, non-government partners may fund habitat restoration projects like the sage steppe restoration proposed in Alternatives 2, 3, and 5.

The economic analysis focuses on the revenues and costs directly related to the project. The social and economic analysis uses indicators including: the number of permitted animal unit months (AUMs), the expected revenue for the number of livestock grazed for the time spent on the allotment, and the cost of grazing per AUM. All costs are averaged, are relative, and are to be used for comparison only (Table 31 **).

The values displayed in the Revenue for time livestock graze the allotments row (Table 31**) were derived in the following manner. First, the assumption is that a 10 month old calf sold at auction weighed 500 pounds. The March 2014 price for calves at market was $216.00 per cwt (one hundred weights) was based on data from the US Department of Agriculture (http://ycharts.com/indicators/calf_price).

By multiplying $216.00 by 5 (for a 500 hundred pound calf), one derives the value of $1080.00 for the price of a calf. To determine the Revenue for time livestock graze the forest, multiply the number of calves found in the Number of head on the allotments row below and then divide by 2. The values below are not segregated by county.

Indicator	Current	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Number of Head on Allotments	370 (FS only)	0	433 (FS only)	608 (FS only)	433 (FS only)	548 (FS only)
Average Days / Months on Allotments	60/2	0	60/2	60/2	60/2	60/2
Head Months/AUMs	713/941 (FS only)	0	939/1,239 (FS only)	1290/1,702 (FS only)	939/1,239 (FS only)	1164/1538 (FS only)

Revenue for time livestock graze the allotments *	$199,880	0	$233,820	$328,320	$233,820	$295,920
Grazing Fees Received by the Government **	$1270.35	0	$1,672.65	$2,297.70	$1,672.65	$2076.30
Mitigation Projects/if monitoring dictates than more mitigations	0	0	$371,350/up to $559,350	$371,350/up to $559,350	$64,450/ up to $251,450	$371,350/up to $559,350
Administration / Monitoring by FS	0	0	$18,000	$18,000	$13,500	$18,000

Table 31**. Social and Economic Indicators by Alternative
**Grazing fees received by governmentt – assumed $1.35 per AUM

The following section describes the effects by Alternative. The spatial extent of the cumulative effects analysis is the three allotments. The timeframe is ten years from the date the decision is signed.

3.4.3.2 Alternative 1- No Action/No Grazing
Direct/Indirect Effects: Under this Alternative, there would be no income to the government from grazing fees. All structural range improvements (such as fences) currently in place for control or management of livestock would be removed. The rancher would have to offset the difference in the amount money netted per animal from the use of forest system lands by augmenting with leased private pastures or other methods.

3.4.3.3 Effects Common to Alternative 2, 3 & 5.
Direct/Indirect Effects:

The mitigations common to Alternative 2, 3 & 5 includes .10 mile of exclosure fence to fence a fen, 1646 acres of juniper thinning but through monitoring the possibility of additional mitigations include: to fence 1 mile exclosure fences around two historic sites and fencing riparian sections that do not meet proper functioning condition within three year of implementation of juniper thinning. The riparian sections total 16.8 miles in fencing. New fencing cost approximately $10,000 per mile for materials and construction. Thinning juniper cost approximately $225 an acre. The total mitigation costs for Alternative 2 would be approximately $371, 350 but if monitoring indicates additional mitigations is needed than it could bring the cost up to $559,350.

The total administration and monitoring requirements for Alternative 2 would be 60 person-days. These days are calculated for the first 3 years of the AMP implementation when monitoring determines the success of the proposed action and mitigation measures. If monitoring indicates additional adaptive management is needed, then the monitoring remains at a stable level, however, if the proposed action and mitigation measures are successful then monitoring days decrease.

3.4.3.4 Alternative 2

Direct/Indirect Effects: Under this Alternative, there would be less income to the government from grazing fees than Alternative 3 and 5. The reduction of 463 AUMs on the West Valley Allotment would result in the loss of $43,985 to the local economy.

3.4.3.5 Alternative 3

Direct/Indirect Effects: Under this Alternative, the government would receive the greatest amount of grazing fees.

3.4.3.6 Alternative 4

Direct/Indirect Effects: Under this Alternative, there would be less income to the government from grazing fees than Alternative 3 and 5. The reduction of 463 AUMs on the West Valley Allotment would result in the loss of $43,985 to the local economy.

Alternative 4 mitigations includes .10 mile of exclosure fence to fence a fen, 282 acres of juniper thinning but through monitoring the possibility of additional mitigations include: to fence 1 mile exclosure fences around two historic sites and fencing riparian sections that do not meet proper functioning condition within three year of implementation of juniper thinning. The riparian sections total 16.8 miles in fencing. New fencing cost approximately $10,000 per mile for materials and construction. Thinning juniper cost approximately $225 an acre. The total mitigation costs for Alternative 4 would be approximately $64,450 but if monitoring indicates additional mitigations is needed than it could bring the cost up to $251,450.

The total administration and monitoring requirements for Alternative 4 would be 45 person-days. These days are calculated for the first 3 years of the AMP implementation when monitoring determines the success of the proposed action and mitigation measures. If monitoring indicates additional adaptive management is needed, then the monitoring remains at a stable level, however, if the proposed action and mitigation measures are successful then monitoring days decrease.

3.4.3.7 Alternative 5

Direct/Indirect Effects: Under this Alternative, there would be less income to the government from grazing fees than Alternative 3 and 5. The reduction of 164 AUMs on the West Valley Allotment would result in the loss of $15,580 to the local economy.

3.4.4 Effects on Environmental Justice and Civil Rights

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-include populations.

Nationally, the number of ranches where a female or minority is identified as a primary operator or ranch owner is 19% (USDA, 2010). The majority of the Farm principle operators in Modoc County are not minorities (Table 32). However, in respect to the national analysis, the permittee(s) on one of the three allotments in the analysis can be a woman or minority. The Forest Service does not maintain records on the minority status of permit holders or their employees and does not discriminate in the permitting process.

This project would not generate a disparate impact on minority or low income populations. The project alternatives, given the size of potential social and economic effects, are also not likely to result in civil rights impacts to Forest Service employees or customers of its programs.

Table 32. Farm Principle Operator in Modoc County.

Ethnicity of Farm Principle Operator in Modoc County	Number of Farm	Acres
White	436	537385
Black/African American	1	no data
Asian	1	no data
Hispanic	33	30077
Native American	6	210
Women	90	74877

3.5 Fisheries and Aquatic Species

3.5.1 Introduction

A Biological Assessment and Biological Evaluation was prepared to review the proposed South Warner Grazing Project to determine the potential of proposed management actions to impact aquatic species that are federally listed, including Proposed species, or designated as "sensitive" by the Regional Forester, Pacific Southwest Region. Sensitive species are species that are recognized by the Regional Forester as needing special management attention in order to prevent them from becoming threatened or endangered. These documents were prepared in accordance with the Endangered Species Act of 1973 (as amended) and follows standards established in the Forest Service Manual (FSM 2671.2 and 2672.4). The Biological Assessment and Biological Evaluation evaluate proposed management actions to determine whether the actions being proposed would result in a loss of viability at the Forest level or contribute to the species becoming Federally listed under the Endangered Species Act.

3.5.2 Scope of Analysis, Methodology, and indicators

The Fish and Wildlife Service (FWS) Klamath Falls Fish and Wildlife Office website was accessed to download the "Listed, Proposed, and Candidate Species that may occur in Modoc County, California". This list was last updated by the FWS February 24, 2014.

Three aquatic endangered species, the Modoc sucker (Catostomus microps), Lost River sucker (Deltistes luxatus), and shortnose sucker (Chasmistes brevirostris) occur on the Modoc National Forest. One proposed species, the Oregon Spotted frog, was historically found in Modoc County.

Management for the Forest is detailed in the Modoc National Forest Land and Resource Management Plan (LRMP), Sierra Nevada Forest Plan Amendment (2004), Lost River and Shortnose Sucker Recovery Plan (1993), Final Rule of Endangered Status and Critical Habitat for Modoc Sucker (1985), and other documents, which are referenced in the LRMP.

The Biological Evaluation (BE) evaluates the effects of the South Warner Grazing Analysis on USDA Forest Service Pacific Southwest Region 5 sensitive aquatic species found on the Modoc National Forest. It follows standards established in Forest Service Manual direction (FSM 2672.42).

The following Table 33 documents the aquatic species that are present on the Forest. The Region 5 Regional Forester's Sensitive species list dated June 30, 2013 was used to determine the species that should be included in this analysis.

Common Name	**Scientific Name**	**Taxon**	**Category for Project Analysis ***
California floater	*Anodonta californiensis*	Invertebrate	1
Topaz juga	*Juga acutifilosa*	Invertebrate	1
Black juga	*Juga nigrina*	Invertebrate	1
Willow Creek pyrg	*Pyrgulopsis lasseni*	Invertebrate	1
Western pond turtle	*Emys marmorata*	Reptile	3
Goose Lake sucker	*Catostomus occidentalis lacusanserinus*	Fish	1
Goose Lake tui chub	*Gila bicolor thallassina*	Fish	1
Goose Lake lamprey	*Lampertra tridentate ssp.*	Fish	3
Goose Lake redband trout	*Oncorhynchus mykiss pop 6*	Fish	3
Warner Valley redband trout	*Oncorhynchus mykiss pop 4*	Fish	1
Hardhead	*Mylopharodon conocephalus*	Fish	1
Pacific lamprey	*Entosphenus tridentatus*	Fish	1

Table 33. USDA Forest Service Region 5 Sensitive Aquatic Species that occur or have habitat downstream from the Modoc National Forest.

* Category 1: MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.
Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.
Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

3.5.3 Affected Environment

Threatened, endangered, and proposed species

Three aquatic endangered species, the Modoc sucker (Catostomus microps), Lost River sucker (Deltistes luxatus), and shortnose sucker (Chasmistes brevirostris) occur on the Modoc National Forest. One proposed species, the Oregon Spotted frog, was historically found in Modoc County.

Modoc sucker - The Modoc sucker historically occurred in small tributaries of the Upper Pit River in Lassen and Modoc Counties, California, but is now found only in portions of two small drainage systems in Modoc County. Preferred habitat of the species consists of small streams characterized by large shallow pools with cover, soft sediments, and clear water. Food of the Modoc sucker consists of benthic invertebrates, algae, and detritus. During spring spawning runs, the species ascends creeks or tributaries that may be dry during summer months.

A 1978 California Department of Fish and Game survey reported the species from eight creeks: Washington, Hulbert, Turner, Willow, Ash, Dutch Flat, Johnson, and Rush. Additional streams were inhabited by the species historically, but their small, often intermittent stream habitat indicates that Modoc suckers may have never been common. Habitat degredation has removed natural barriers and allowed hybridization with the related Sacramento sucker (Catostomus occidentalis) , threatening the genetic integrity of the Modoc sucker.

On June 11, 1985, the Fish and Wildlife Service determined the Modoc sucker to be an endangered species. Critical habitat was also designated for the Modoc sucker. A designation of critical habitat does not create a management plan for a listed species. Designation does not automatically prohibit certain actions, establish numerical population goals, or prescribe specific management actions (inside or outside of critical habitat). However, critical habitat may provide added protection for areas designated and thus assist in achieving recovery. Areas designated as critical habitat receive protection under Section 7 of the Endangered Species Act with regard to actions carried out, funded, or authorized by Federal Agencies.

Lost River sucker and shortnose sucker – The Lost River sucker and shortnose sucker are endemic to the upper Klamath Basin which includes the Upper Klamath River, Oregon/California and the Lost River system in north-central California and south/central Oregon. These species are found within the Lost River drainage on Devil's Garden and Doublehead Districts; these fish are known to be widespread in Willow, Boles, and Fletcher Creeks as well as in pools and wetlands. Primarily lake residents, these fish migrate into stream and have been documented to successfully spawn, and live year round on the Forest. Radio-telemetry studies on these fish are on-going by National Biological Survey (NBS) and Bureau of Reclamation (BOR) personnel. They are also extremely long-lived: shortnose suckers have been

aged to 33 years and Lost River suckers to 43 years. Both species are listed as endangered by the Federal Government and the State of California.

Habitat for these species consists of open water in lakes and streams, except when they move upstream to spawn. Fish begin making short migrations up into streams when discharge increases at any time from early February through early April, although March is probably the most frequent month of movement (Scoppetone et al. 1995). In Willow Creek radio-tagged suckers were found to migrate only 3-6 km and remain on spawning grounds for 2-3 weeks (Perkins and Scoppetone 1996). Larvae emerge and spend at best only a short time in shallow water along stream edges before moving into lakes. Larval downstream movement occurs mostly at night over about a 6 week period from late march to early June; the timing of outmigration depends on spawning time.

The Lost River sucker and shortnose sucker were listed as a Federal endangered species in 1988. On December 1, 1994, the U.S. Fish and Wildlife Service proposed critical habitat for the Lost River sucker and the shortnose sucker of the Upper Klamath River Basin of Oregon and California (proposed rule). The Final Rule designating critical habitat for Lost River sucker and shortnose sucker was published on December 11, 2012. Critical habitat are lands that were determined to be occupied at the time of listing and continue to be occupied that contain the physical or biological features to support life-history processes essential to the conservation of the Lost River sucker and shortnose sucker.

Oregon spotted frog -
The Oregon spotted frog (*Rana pretiosa)* is named for the characteristic black spots covering the head, back, sides and legs. The dark spots have ragged edges and light centers, usually associated with a tubercle or raised area of skin. These spots become larger and darker, and the edges become more ragged with age. Breeding occurs in February or March at lower elevations and between early April and early June at higher elevations. Males and females separate soon after egg-laying with females returning to fairly solitary lives. Males often stay at the breeding site, possibly for several weeks until egg-laying is completed.

The summarized condition required for Oregon spotted frog life cycle is shallow water areas for egg and tadpole survival, perennially deep, moderately vegetated pools for adult and juvenile survival in the dry season, and perennial water for protecting all age classes during cold wet weather.

Historically, the Oregon spotted frog ranged from British Columbia to the Pit River basin in northeastern California. Currently, the Oregon spotted frog is found from extreme southwestern British Columbia south through the Puget Trough, and in the Cascades Range from south-central Washington at least to the Klamath Basin in southern Oregon. In addition, Oregon spotted frogs currently have a very limited distribution west of the Cascade crest in Oregon, are considered to be extirpated from the Willamette Valley in Oregon, and my be extirpated in the Klamath and Pit River basins of California. In California, this species has not been detected since 1918 (California Academy of Science Museum Record 44291) at historic sites and may be extirpated (USFWS 2013).

In the spring of 2013, the Klamath Falls Fish and Wildlife Office (KFFWO) field crew undertook surveys of known occupied Oregon spotted frog habitat in Klamath County, OR and potential habitat in Modoc County. The KFFWO collaborated with federal agencies to identify potential habitat on federal lands of Modoc County and surveys were carried out according to USGS protocol developed in 2009 and data was recorded on their standardised data sheets. The goal for the 2013 surveys was to visit each site a minimum of two times 1-2 weeks apart during the breeding season. No evidence of Oregon spotted frogs was found at any of the California sites (USFWS 2013).

Sensitive Species

The following section provides a very brief account of the distribution and types of habitat utilized for each sensitive species analyzed within this document.

California floater - The California floater is a freshwater mussel with a historical distribution from southern British Columbia to northern Baja California (California Floater fact sheet). Its current range is the Fall and Pit Rivers, Shasta County (USDA Forest Service 1998). It occurs in lakes and slow rivers, generally on soft substrates (mud-sand) in fairly large streams and lakes only, in relatively slow current (USDA Forest Service 1998). Primary threats are eutrophication from agricultural runoff and urbanization, sedimentation that smothers mussel beds, water diversions that reduce instream flows, introduction of exotic species, grazing, water impoundments that reduce current velocities and allow for sediment deposition (USDA Forest Service 1998).

This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Topaz juga - The scalloped juga is a large river form gastropod, restricted to swift unpolluted, well-oxygenated areas with gravel/boulder substrate, generally at low elevations (USDA Forest Service 1998). This species still is found in a few widely separated sites in the Pit River, below the falls in Shasta County.

This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Black juga – According to Frest and Johannes (1995), *Juga nigrina* occurs in the upper Sacramento, McCloud, and Pit River systems. They reported collecting this species from31 or 231 sites surveyed in the upper Sacramento and Pit River systems (see Figure 1) and concluded that the species had been extirpated from a "fair number" of historic sites in tributaries to the upper Sacramento River.

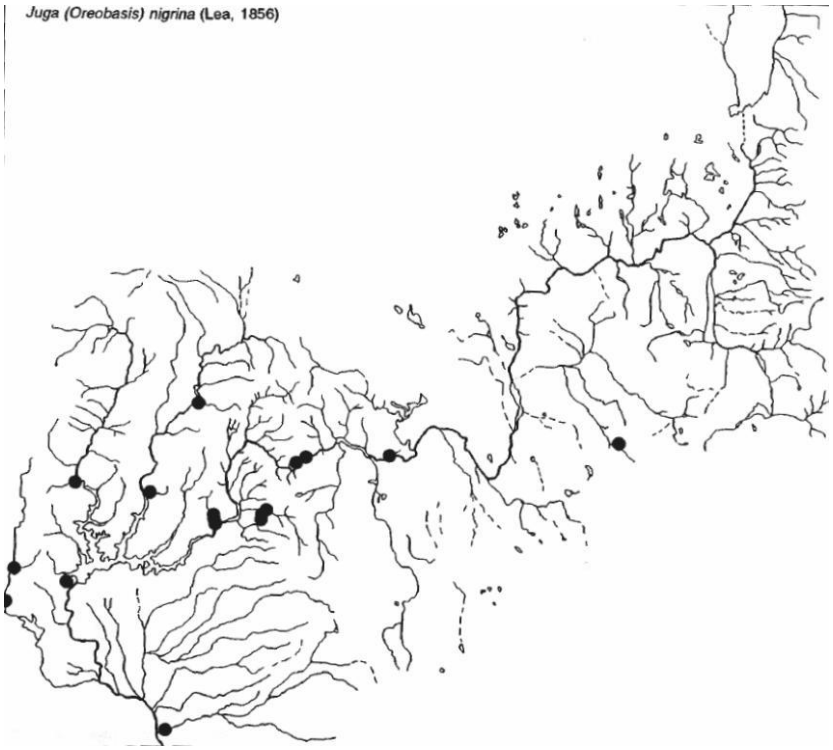


Figure 12. Sites of occurrence (•) for *J. nigrina* in the upper Sacramento basin. Figure reproduced from Frest and Johannes (1995).

Although specific information on *J.nigrina* is not available, studies on *J. silicula* a closely related stream-dwelling species found in the Coast and low Cascade ranges of Oregon (Furnish 1990) and on other members of the genus to which the species belongs indicate that the individuals live for several (5-7) years. Reproductive maturity is reached in about 3 years.

This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Willow Creek pyrg – *Pyrgulopsis lasseni* is restricted to a few localized sites in upper reaches of Willow Creek and one associated warm (20-22 C) spring complex consisting of about seven springs tributary to Willow Creek, which is a tributary to the Pit River in the Modoc National Forest.

This species occurs in Modoc National Forest, Lassen County at three localities: 1) about 0.49 km east of Willow Creek Campground; 2) Willow Creek just upstream of Hayden Hill Road, FS road 37N42; and Willow Creek at the lower end of Lower McBride Springs. The species is not known to occur outside of California. For species like *P. lasseni* that are restricted to springs and spring outflows, they are typically restricted to the site of spring influence and do not disperse far from the localized site.

There is no connectivity between the proposed project and habitat for the species. This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Western pond turtle - Northwestern pond turtles have been sighted in several locations on the Forest, including Willow Creek on Big Valley RD, Lost River on Doublehead RD, and along the Pit River near Alturas. Pond turtles utilize a variety of habitats in areas with permanent or relatively permanent water that have a slower current. They require basking sites (e.g. partially submerged logs, rocks, open mud banks) and are omnivorous.

Goose Lake sucker - The Goose Lake sucker is a described subspecies of Sacramento sucker. The Goose Lake sucker was originally described in 1913 as a subspecies (Fowler 1913) and further studies indicated that the subspecies was distinct, but the differences minor. During their second year, Goose Lake suckers migrate in April or May, depending on water temperature, to spawn in streams that are tributary to the lake (Martin 1967). Adults have been found in the lake, some of the streams, and some of the reservoirs throughout the year. During summer, young suckers are very abundant in shallow water among aquatic macrophytes. Goose Lake suckers feed primarily on algae and diatoms (Martin 1967).

This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Goose Lake tui chub – In California tui chubs are native mostly to interior drainages, except the Central Valley, and absent from all coastal drainages, except where introduced. In the Sacramento-San Joaquin drainage tui chubs are native only to Pit River downstream at least as far as Hat Creek and Lake Britton and to Goose Lake, although they have been introduced into some reservoirs and ponds in various locations.

The Goose Lake tui chub is considered by Snyder (1908) to be the native tui chub of the upper Pit River from Big Valley upstream to and including Goose Lake. Hubbs et. al. al. (1979) determined that the Pit River form and the Goose Lake form of tui chub were distinct and that the Goose Lake tui chub was a distinct subspecies with the *thalassina* name. Tui chubs in general are opportunistic omnivores and consume a wide variety of aquatic invertebrates (Moyle 1976). Tui chubs are abundant and widely distributed, and so are not in trouble as a species (Moyle 2002).

This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Goose Lake lamprey - The Goose Lake lamprey is an undescribed subspecies of the sea-run Pacific lamprey (*Entonsphenus tridentata*). It is likely that they migrate up suitable tributary streams in winter or spring to spawn. They have to move up far enough, possibly 12-19 miles upstream of the lake to find gravel for spawning and to have enough suitable soft-bottomed habitats downstream of the spawning area for survival of the ammocoetes. The ammocoetes probably spend 4 to 6 years in streams before metamorphosing into adults and moving out into the lake.

There is a need to develop an understanding of the taxonomy and life history of this form of landlocked population.

Goose Lake redband trout - The name redband trout is used to cover a confusing complex of distinctive trouts that occur in isolated headwater streams of the McCloud, Pit, Klamath, and Columbia River systems of California, Nevada, and Oregon. The Goose Lake redband trout is endemic to Goose Lake and its major tributaries (Lassen and Willow creeks in California and the extensive Thomas Creek system and Crane Creek in Oregon) as well as to smaller streams such as Cottonwood Creek in California and several small streams in Oregon. Berg (1987) reported that Joseph, Parker, and East creeks (tributaries of the upper Pit River in California) contained trout genetically similar to Goose Lake redband. This species has both lake and stream dwelling populations, which both rely on headwater streams for spawning. Riffles with clean gravels and suitable water temperatures are required.

> The long-term persistence of this fish depends largely on the health of populations in the headwater streams flowing into Goose Lake in Oregon and California, even though much of the conservation attention has focused on large fish in the lake itself. The extirpation of the lake population during a drought and its subsequent partial recovery indicate the probable importance of downstream colonization of the lake from headwater populations. Because of the high level of concern over extirpation of Goose Lake redbands (and other native fishes) from Goose Lake when it dried up, conservation efforts have been under way in the watershed, by both agencies and private landowners, to restore streams (e.g., by changing grazing practices) and to remove or alter migration barriers (Moyle 2002). Populations are currently stable.

Warner Valley redband trout - The Warner Valley redband trout are found in the Warner Valley drainage in south-central Oregon and small portions of northwestern Nevada and northeastern California. They are found in California in the upper Dismal and Twelve mile Creek drainages on the Modoc National Forest. Present abundance of Warner Valley redband trout in streams appears to be low. Population densities ranged from 11 to 456 redband trout per 1 mile in Honey and Twelve mile Creeks, respectively (Tait and Mulkey 1993). Warner Valley redband trout use all habitat types from the lake bottom dominated by rock and mud substrate, to the high gradient upper reaches dominated by pools and riffles with small boulder and cobble substrate.

No treatment is proposed within the watershed occupied by this species. This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Hardhead - Hardhead are large cyprinids, reaching lengths in excess of 60 cm SL. The body shape is similar to that of Sacramento pikeminnow (*Ptychocheilus grandis*), with which they co-occur, but the body is deeper and heavier and the head is less pointed. Hardhead also differ from pikeminnow in that their maxilla does not extend beyond the anterior margin of the eye and they possess a bridge of skin (frenum) connecting the premaxilla to the head. Hardhead have 8 dorsal rays, 8-9 anal rays, and 69-81 lateral line scales. Adults have large molariform pharyngeal teeth, but juvenile teeth are hook-like. Juveniles are silver; adults are brown-bronze dorsally. During the spawning season, adult males develop small white nuptial tubercles on the head and along a band that extends from the head to the base of the caudal fin (Moyle 1976).

Hardhead are widely distributed in streams at low to mid elevations in the Sacramento-San Joaquin and Russian River drainages (Moyle 2002). Their range extends from the Pit River (south of the Goose Lake drainage), Modoc County, in the north to the Kern River, Kern County, in the south. In the San Joaquin drainage, scattered hardhead populations are found in tributary streams, but only rarely in the valley reaches of the San Joaquin River . Jones and Stokes (1987) found a very small number of hardhead during an extensive sampling program of the lower Kings and San Joaquin rivers, indicating that hardhead have opportunities to recolonize historic habitats but fail to do so, due to dewatering and other factors. They are absent from the Cosumnes River. In the Sacramento River drainage, hardhead are found in most large tributaries as well as in the Sacramento River (Moyle 2002). They are widely, if spottily, distributed in the Pit River drainage, including the main Pit River and its series of hydroelectric reservoirs. Although their current status is uncertain, hardhead apparently also once occurred in Alameda and Coyote Creeks. They are present in the northern coast range in the larger tributaries to the Sacramento River such as Cache Creek, Putah Creek, and Clear Creek, mainly in canyon reaches with deep pools.

This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

Pacific lamprey - Pacific lampreys are usually anadromous with two very distinct parts of their life cycle, though some landlocked forms of lamprey exist. Pacific lampreys begin their life cycle as an ammocoete or larvae, usually within a freshwater stream. Ammocoetes burrow tail first into mud or soft substrate where they filter feed on algae and organic matter. The larval lampreys often move around the stream in their 5-7 year stay in freshwater. When the ammocoetes reach a length of around 14-16 cm TL they begin a drastic change in physiology and physical appearance. The larval lampreys take on a silvery form with large eyes and a sucking disc. The newly morphed lampreys swim downstream to the Pacific Ocean where they take on a new predatory lifestyle in an estuarine or saltwater environment. Lampreys rarely stray far from the mouth of their home stream. Pacific lampreys attack and feed on fish including salmon and flatfish. The stay at sea usually lasts 3-4 years in Canada but may be shortened in more southern populations. Like salmon, the lampreys return to freshwater and migrate upstream to spawn and die. Most upstream movement occurs during the night under high flow conditions, and some streams have different runs of lampreys. Runs may be different in the timing of entry to freshwater or in the amount of time spent in freshwater before breeding occurs. Breeding males and females dig a nest in moderately swift water by removing rock and gravel from the stream floor. A female will attach herself to a rock upstream of the nest, and the male will attach himself to the female or to a nearby anchor. The female releases 20,000 to 200,000 eggs in total, and the male releases his milt. The nest is then covered by stirring the substrate upstream of the fertilized eggs. Often one female will have her eggs fertilized by multiple males, as individual nests may be constructed in close proximity to others. Usually the male and female then die, though studies have shown that some adult lampreys live to spawn again the following year. The embryos hatch after roughly 19 days, and the resulting ammocoetes often stay within the safety of the gravel substrate before venturing into the current.

This species does not have suitable habitat that is directly, indirectly, or cumulatively affected by the proposed action and will not be carried forward for further analysis.

3.5.4 Environmental Consequences

3.5.4.1 Alternative 1

Modoc sucker

This species is found outside the watershed of the proposed project area. There will be no direct, indirect, or cumulative effects on these species or its critical habitat.

Lost River sucker and shortnose sucker

This species is found outside the watershed of the proposed project area. There will be no direct, indirect, or cumulative effects on these species or its critical habitat.

Oregon spotted frog

In California, this species has not been detected since 1918 at historical sites. The current Proposed Rule to list the Oregon spotted frog as a threatened species and designate Critical Habitat under the Endangered Species Act does not include any habitat within the State of California. Recent surveys found no evidence of Oregon spotted frogs within Modoc County. There will be no direct, indirect, or cumulative effects on these species or its critical habitat.

California floater, Topaz juga, Black juga, Willow Creek pyrg, Goose Lake sucker, Goose Lake tui chub, Warner Valley redband trout, Hardhead, Pacific lamprey.

These species do not have suitable habitat that is directly, indirectly, or cumulatively affected by the project.

Western pond turtle

Potential beneficial impacts would be the reduction or elimination of livestock related streambank trampling. This would allow the most rapid rate of streambank recovery. Indirect impacts would be a reduction in sedimentation from streambank alteration by livestock and a possible reduction in stream temperature over time with an increase in stream cover in the form of shade

Goose Lake lamprey

Potential beneficial impacts would be the reduction or elimination of livestock related streambank trampling. This would allow the most rapid rate of streambank recovery. Indirect impacts would be a reduction in sedimentation from streambank alteration by livestock and a possible reduction in stream temperature over time with an increase in stream cover in the form of shade

Goose Lake redband trout

Potential beneficial impacts would be the reduction or elimination of livestock related streambank trampling. This would allow the most rapid rate of streambank recovery. Indirect impacts would be a reduction in sedimentation from streambank alteration by livestock and a possible reduction in stream temperature over time with an increase in stream cover in the form of shade

3.5.4.2 Alternative 2, 3, 4 & 5

Modoc sucker

This species is found outside the watershed of the proposed project area. There will be no direct, indirect, or cumulative effects on these species or its critical habitat.

Lost River sucker and shortnose sucker

This species is found outside the watershed of the proposed project area. There will be no direct, indirect, or cumulative effects on these species or its critical habitat.

Oregon spotted frog

In California, this species has not been detected since 1918 at historical sites. The current Proposed Rule to list the Oregon spotted frog as a threatened species and designate Critical Habitat under the Endangered Species Act does not include any habitat within the State of California. Recent surveys found no evidence of Oregon spotted frogs within Modoc County. There will be no direct, indirect, or cumulative effects on these species or its critical habitat.

There will be a "No Impact" determination for the following species for implementation of the South Warner Grazing Analysis: California floater, Topaz juga, Black juga, Willow Creek pyrg, Goose Lake sucker, Goose Lake tui chub, Warner Valley redband trout, Hardhead, and pacific lamprey. These species do not have suitable habitat that is directly, indirectly, or cumulatively affected.

California floater, Topaz juga, Black juga, Willow Creek pyrg, Goose Lake sucker, Goose Lake tui chub, Warner Valley redband trout, Hardhead, Pacific lamprey

These species do not have suitable habitat that is directly, indirectly, or cumulatively affected by the project.

Western pond turtle, Goose Lake lamprey, Goose Lake redband trout

The non-structural improvements used will help improve management and reduce grazing impacts on riparian areas:

- Fell western juniper trees which do not meet "old juniper" characteristics on 88 acres of the S. Fork Pit River to create barriers to livestock trailing along stream banks and to reduce the impacts of juniper encroachment.

- Install a fence around a fen located at T.39N, R14E, Sec. 20 to protect proper hydrological function and fen vegetation.

- Fell western juniper trees, which do not meet "old juniper" characteristics, on 37 acres of an unnamed stream in order to create barriers to livestock trailing along stream banks.

- Fell western juniper trees, which do not meet "old-juniper characteristics, on 157 acres of Little Parsnip Creek in order to create barriers to livestock trailing along stream banks.

In addition, to move towards the desired condition for the riparian reaches that are functioning at risk, more restrictive utilization standards will be implemented. The riparian utilization standards as described below help to identify when a specific threshold is about to be reached and changes need to be made (generally moving cattle to another pasture or coming off the allotment).

- 30% utilization on Herbaceous vegetation
- Streambank Alteration of 20%
- 20% utilization on Woody Herbaceous
- Stubble Height of 5"

The utilization standards for streams functioning at risk, and those set for other riparian areas have been used successfully on the Forest to recover habitat for riparian dependent species. They have been used for the recovery of the threatened and endangered Lost River sucker, shortnose sucker, and Modoc sucker as part of a Biologocal Opinion on grazing management (US Fish and Wildlfife 1996) on other areas of the Forest. After implementation, key areas in the riparian sections will be monitored and if the riparian utilization standards are exceeded three years in a row during normal precipitation years than the next step will be to fence those sections that are not moving towards desired conditions.

Potential beneficial impacts to the Western pond turtle, Goose Lake lamprey, and Goose Lake redband trout would be the reduction or elimination of livestock related streambank trampling. This would allow the recovery of streambanks. Indirect impacts would be a reduction in sedimentation from streambank alteration by livestock and a possible reduction in stream temperature over time with an increase in stream cover in the form of shade.

3.6 Fuels

3.6.1 Introduction

The Modoc National Forests Warner Mountain Ranger District is conducting the South Warner Mountain Range Analysis. The project area is located approximately 10 miles east of Likely California, in Modoc and Lassen Counties. The project falls within the Fitzhugh and Patterson Management areas on the Southern portion of the Warner Mountain Ranger District. The analysis area involves the Outlet C&H, West Valley C&H and Parsnip C&H allotments. The

project area is located within portions of: T38N, R14E sections 1-5, 10-16, 22 and 23; T38N, R15E sections 17, 20, 29, 32; T39N, R14E sections 2-3, 5-11, 14-17, 20-29, 32-36 and T39N, R15E section 32.

The project analysis area is approximately 18,000 acres and can be described as rolling hills with gentle topography and scattered flats. Elevation ranges from 4600 feet to 7160 feet with a moderate climate and an average annual rainfall between 20 and 40 inches. Rainfall occurs during low to moderate intensity rains in the winter, often turning to snow in the mountains.

Western Juniper and a minor component of Ponderosa Pine form the overstory in the lower elevation foothills. Ground cover consists of shrubs interspersed with annual and perennial grasses. Sagebrush, rabbitbrush, bitterbrush and mountain mahogany are typical shrubs found throughout the project area. Sandberg Bluegrass, Idaho Fescue, bluebunch wheatgrass, giant ricegrass and Lemmon's needlegrass are common native grasses in the project area. Cheatgrass, a non-native invasive species is also common. Meadows and Riparian areas support sedges, rushes, slender wheatgrass, Kentucky bluegrass, bentgrass and many other herbaceous species. Woody riparian species include aspen, willow, cottonwood and dogwood.

The project proposes to cut a total 1645 acres of non-old growth juniper as part of the projects proposed actions. Characteristics of old growth juniper are described in the Sage Steppe Ecosystem Restoration Strategy EIS (R5-MB-161, April 2008).

Treatment goals are to increase shrub, grass and forb production, thereby enhancing forage base for wildlife and livestock. The fallen juniper trees will also serve as barriers to livestock trailing along streambanks, thereby reducing grazing impacts on riparian areas.

This report will address the effects of the proposed actions on the Hazardous Fuels environment as it relates to managing towards desired conditions consistent with the *Modoc National Forest Land and Resource Management Plan* as amended by the *Sierra Nevada Forest Plan Amendment* (SNFPA).

3.6.2 Scope of Analysis, Methodology, and Indicators

Alternatives were compared by evaluating the direct, indirect, and cumulative effects of each alternative on the fuels environment and the resulting fire behavior under 90th percentile weather. Projected estimates were made for quantitative measures of fire behavior such as flame length, rate of spread, and fire-line intensity. Estimates were derived using critical weather percentiles for the Modoc National Forest shown below in Table 34. Critical weather percentiles were used in combination with references 1, 2 and 9.

Modoc I (SIG) 1961-2012- May 1st—October 1st

Variable	**80th**(Moderate)	**90th**	**97th** (Severe)
Woody F.M.	67 %	63 %	60 %
Herbaceous F.M.	4 %	3 %	2 %
1 Hr. F.M.	3 %	2 %	2 %

10 Hr. F.M.	4 %	4 %	3 %
100 Hr. F.M.	7 %	6 %	5 %
1000 Hr. F.M.	9 %	8 %	6 %
BI	70	78	91
ERC	75	81	87
20’ Wind Speed	12 mph	16 mph	21 mph
RH	19 %	15 %	11 %
Air Temperature	83°	86°	90°

Table 34

The scope of the analysis is within the project area, where rangeland fuels are similar. The cumulative effects boundary used for evaluating the incremental impacts of the alternatives to the combination of past, present, and reasonably foreseeable future actions was the analysis area.

3.6.3 Affected Environment

Natural fuels within the proposed project area are non-continuous, with some areas of open ground void of vegetation, or containing extremely sparse fuel. The area is actively grazed. Grasses and shrubs typically make up the understory with a minor component of ponderosa pine and significant juniper in the overstory. Significant juniper encroachment down slope into the sage-steppe ecosystem has resulted in moderately high densities of juniper trees in Phase II and III of development.[1,3,10] Skeletal shrub remnants and areas of bare ground, void of fine fuels or any native vegetation are indicative of the competition and rapid expansion of juniper. Some heavily encroached areas can be considered hazardous, and crown fuels are conducive to tree to tree propagation of fire. Past wood cutting activities have created patchy distributions of light-moderate slash in the project area. Previous juniper felling activities in the West Valley allotment have created dis-connected areas with juniper barriers along portions of creeks. A total of 2588 acres have been burned since 1942, and 177 acres commercially thinned or salvaged with the activity fuels being treated. Patchy areas from previous juniper felling operations have left untreated, unpiled, bolewood and light slash.

The natural Fire Regime of the project area is classified as Fire Regime II, characterized by frequent, high-moderate severity fires, typically burning at 10-50 year intervals. [1,5] Increased Juniper densities due to effective fire suppression and past grazing practices puts the area in Fire Regime II condition class 2 and 3, with moderate to high departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity, and pattern.[3,5,6] The regular occurrence of fire in this ecosystem historically kept the encroachment of juniper into the sage-steppe ecosystem in check, typically confining juniper to fire protected, rocky areas void of fuel. Effective fire suppression has allowed the juniper to increase in numbers, expanding their range. This is displacing the desired shrub, forb and grass components in this sage-steppe ecosystem and gradually converting it to juniper woodland.

Analysis of fire history for the project area shows 7 lightning caused starts within the last 70 years that were greater than 10 acres.

3.6.4 Environmental Consequences

3.6.4.1 Alternative 1
DIRECT/INDIRECT

The no-action, no grazing alternative will allow further encroachment of Western Juniper into the sage-steppe ecosystem. Additional tree in filling and expansion will continue to out-compete the desired understory vegetation and result in juniper stand densities that are hazardous and vulnerable to crown fire.

No grazing will allow the build-up of fine fuels in areas over time. This will increase the available fine fuel bed for burning. The continuous fine fuel bed links the other surface fuels and slash to vertical and aerial fuels in areas of heavy juniper encroachment. When a fire does occur, the fire will spread rapidly through the build-up of fine fuels resulting in areas with rapid, full fire involvement. The rapidly moving surface fire will move into the juniper stands igniting the low limbs, torching trees, lofting fire brands, spotting and potentially leading to crown fire ignition. The fire will burn with greater severity and intensity and have larger fire perimeter growth because of the increased fire behavior and rapid rates of spread. The anticipated flame length of 9 feet and high fire line intensity (767) Btu/Ft/S will dictate in-direct fire suppression tactics. Consequently fire suppression costs will increase because of the larger fire area, faster rates of spread and increased resistance to control. Juniper canopy closure and continuity will also diminish the effectiveness of aerial retardant applications, leading to increased use of the costly retardant contributing to higher fire suppression costs. Safety and fire suppression effectiveness will be reduced for defending forest users, private property, improvements and structures that exist now, and potential ones that may develop or be built in the future.

The severity of the potential fire will jeopardize wildlife habitat and diminish rangeland forage production. The severity of the resulting fire and the extensive area of disturbance could potentially make the site vulnerable to the invasion of cheat grass and medusa head. Invasion of invasive weeds would further displace the desired native grass, forb and shrub vegetation.[1,3,6,10]

Private woodcutting activities may increase as more junipers become available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other OHV use may increase the risk of fire.

Expansion of juniper will further reduce understory vegetation by canopy interception of falling precipitation. Canopy interception of falling rain, created by the extensive surface area of juniper foliage, reduces the amount of penetrating water for understory plant growth. The high competitive ability of juniper for water, created by the multi- layered roots will also diminish the available water for understory plant growth. [6]

Increased juniper canopy cover and the loss in understory vegetation will potentially increase the areas of bare soil. During storms and spring melt-off, areas of bare soil will have the potential for increased overland flow, gullying, sedimentation and accelerated erosion.[1,3,6] Increased

woodcutting and the associated off-road vehicle use for wood extraction will increase the potential for sedimentation and erosion by damaging covering vegetation and exposing soil.

A damaging fire will potentially reduce rangeland values and defer grazing in the project area and surrounding ranchlands, having a negative, indirect economic effect on local ranchers and the community. The expansion of juniper and the distribution of fine fuels create a hazardous fuels environment that has the potential to burn with high to extreme fire behavior and spotting potential, jeopardizing adjacent private fuels reduction and timber harvest projects. A damaging fire will also jeopardize previous agency investments like the: 2008 Range Forage Improvement (Blue Fire Forest Recovery Project) in the West Valley and Outlet Allotments.

CUMULATIVE

Previous juniper felling treatments from past activities that left pockets of untreated juniper on the ground could potentially lead to high fire severity effects when a fire does occur. A rapidly spreading fire in the project area could move into and ignite areas of untreated, unpiled juniper. The long burning duration (residence time) and contact of juniper bolewood with the ground allows for the downward heat transfer into the soil. The long burning duration and intensity will create fire disturbed areas with ash and exposed mineral soil. These conditions will be ripe for the invasion of cheat grass, medusa head and thistle. [6,10]

3.6.4.2 Alternatives 2, 3 and 5

DIRECT/INDIRECT

These action alternatives have similar effects on fire behavior and will reduce the further encroachment of Western Juniper into the forage producing rangeland. Continued grazing will keep the fine fuel production in check. Grazing reduces the continuity of the fine fuel bed that links the surface fuels, ladder fuels and overstory canopy. Grazing will lower rates of spread and reduce fire intensity, helping fire suppression activities. Reductions in juniper canopy closure and continuity will provide for more effective use of aerial retardant. The anticipated flame length of 5 feet and the reduced fire line intensity of 207 Btu/Ft/S under these alternatives will allow for direct or slightly indirect fire suppression tactics. Fire suppression costs will decrease because of the smaller involved fire area, reduced rates of spread and the ability to go direct as a fire suppression tactic. Reductions in Juniper canopy closure will increase the effectiveness of aerial retardant application. Fire suppression effectiveness and safety will be increased for forest users, private property owners, improvements and structures that exist now, and potential ones that may develop or be built in the future.

The reduced intensity of the potential fire will help protect and maintain wildlife habitat and rangeland forage production and perpetuate the lower intensity fire regime characteristic of the Sage Steppe ecosystem.

Private woodcutting activities may increase as felled and piled juniper becomes available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other OHV use may increase the risk of fire, but the severity of the fire effects will be reduced because of the actions of the alternative.

The falling, lop and scattering, piling, burning and utilization of juniper trees will reduce the fire severity threat and significantly reduce the hazardous fuel condition. Fires will still occur, but

would burn through ground and surface fuels with less intensity. The torching, lofting of firebrands and potential for large fire perimeter growth will be reduced. Consequently fire suppression costs will be less as fires would: not spread as rapidly, be easier to control, be smaller in size and be less detrimental in terms of fire severity effects to the sage-steppe ecosystem.

The raw material generated from falling juniper trees should be effective in reducing grazing impacts on riparian areas by creating restrictive barriers. The continuous arrangement of juniper trees lining the riparian areas in contact with each other while retaining foliage is a fire hazard. Empirical evidence support that the foliage will fall from the trees within 18 months and significantly reduce the fire hazard. The bare wood skeletal remains of juniper without the flashy foliage are significantly less hazardous in terms of rapidly propagating fire.

1364 acres of activity fuels will be lop and scattered or piled and burned. Lop and scatter would be the primary treatment. The potential impact of fire is only marginally increased in the short term due to foliage retention. Once foliage drops off the potential impact greatly subsides. In areas where lop and scatter would create a continuous layer of heavy slash, piling and burning would be the preferred method. By implementing piling and burning only in areas where residual slash creates a potential hazard, fire behavior and intensity would still be reduced after project completion, thus creating more effective fire suppression and fewer acres burned.

Pile burning is a method of disturbance and pile burn areas will have the potential to be invaded by cheat grass, medusa head and thistle.[1,3,6]

Reducing juniper encroachment will decrease competition with understory vegetation. Canopy interception of falling rain will be greatly reduced by removing the juniper overstory and more rainfall will reach the ground and be available for forage production. The multi-layered roots of juniper will degrade after felling, diminishing competition and making more water available for understory plant growth. [6]

Reduced juniper canopy cover and the collateral increase in understory vegetation will potentially decrease the areas of bare soil. Increased vegetation cover will decrease the areas of exposed soil and will reduce erosion potential during winter rains and spring melt-off.

The smaller, easier controlled fire under this alternative will potentially protect rangeland resources in the project area and surrounding ranchlands. This will preserve the beneficial, economic effect of productive Forest Service rangelands on local ranchers and the local community.

The reduced encroachment of juniper trees diminishes the overall fire behavior and spotting potential, makes fire suppression more effective, and would not jeopardize adjacent, private fuels reduction and timber harvest projects. The reduced fire intensity will help protect previous agency investments like the: 2008 Range Forage Improvement (Blue Fire Forest Recovery Project) in the West Valley and Outlet Allotments.

This alternative will reduce the threat to wildlife habitat from catastrophic fire by reducing the intensity, rate of spread and crown fire potential in the project area. This alternative will also provide for a quicker recovery if a fire were to burn by reducing the severity of effects on the rangeland resources.

CUMULATIVE
Previous juniper felling treatments, fire salvage and sanitation cuts, in combination with this alternative are effective in breaking up the juniper canopy continuity in the project area. Past fire salvage and sanitation cuts have removed standing dead and surface fuels. Cumulative reductions in juniper coverage in combination with past activities will be effective in reducing extreme fire behavior during a burning fire. Reduced fire behavior will protect wildlife habitat and rangeland resources from the high severity effects of fire. Reduced burning durations and a lower intensity fire will not create extensive fire disturbed areas. These conditions would not be conducive for the invasion of cheat grass, medusa head and thistle after the occurrence of fire. [6,10] Areas of untreated and unpiled juniper on private and public lands could more effectively be protected from a slower moving, less intense fire.

3.6.4.3 Alternative 4
DIRECT/INDIRECT

This alternative was developed to not implement the sage steppe restoration strategy and to reduce West Valley permitted grazing. This will continue to allow juniper encroachment and canopy cover would not be reduced. This will allow further encroachment of Western Juniper into the sage-steppe ecosystem. Additional tree in filling and expansion will continue to out-compete the desired understory vegetation and result in juniper stand densities that are hazardous and vulnerable to crown fire.

Reduced grazing may allow for increased fine fuel production in the West Valley allotment over time. This will potentially increase the available fine fuel bed for burning. The continuous fine fuel bed links the other surface fuels and slash to vertical and aerial fuels in areas of heavy juniper encroachment. When a fire does occur, the fire will spread rapidly through the fine fuels resulting in areas with rapid, full fire involvement. The rapidly moving surface fire will move into the juniper stands igniting the low limbs, torching trees, lofting fire brands, spotting and potentially leading to crown fire ignition. The fire will burn with greater severity and intensity and have larger fire perimeter growth because of the increased fire behavior and rapid rates of spread. The anticipated flame length of 7 feet and moderate fire line intensity (344) Btu/Ft/S will dictate in-direct fire suppression tactics. Consequently fire suppression costs will increase because of the larger involved fire area, faster rates of spread and increased resistance to control. Juniper canopy closure and continuity will also diminish the effectiveness of aerial retardant applications, leading to increased use of the costly retardant contributing to higher fire suppression costs. Safety and fire suppression effectiveness will be reduced for defending forest users, private property, improvements and structures that exist now, and potential ones that may develop or be built in the future.

The moderate severity of the potential fire may jeopardize portions of wildlife habitat and diminish rangeland forage production. The moderate severity of the resulting fire and the large area of potential disturbance could make the site vulnerable to the invasion of cheat grass and medusa head. Significant invasion and colonization of invasive weeds would further displace the desired native grass, forb and shrub vegetation.[1,3,6,10]

Private woodcutting activities may increase as more juniper becomes available for utilization. Slash created from woodcutters will accumulate in the project area. Off-road vehicle use during wood cutting activities and other OHV use may increase the risk of fire.

Barriers created by juniper felling activities will be effective in reducing livestock trailing along stream banks.

Expansion of juniper will further reduce understory vegetation by canopy interception of falling precipitation. Canopy interception of falling rain, created by the extensive surface area of juniper foliage, reduces the amount of penetrating water for understory plant growth. The high competitive ability of juniper for water, created by the multi- layered roots will also diminish the available water for understory plant growth. [6]

Increased juniper canopy cover and the loss in understory vegetation will potentially increase the areas of bare soil. During storms and spring melt-off, areas of bare soil will have the potential for increased overland flow, gullying, sedimentation and accelerated erosion.[1,3,6] Increased woodcutting and the associated off-road vehicle use for wood extraction will increase the potential for sedimentation and erosion by damaging covering vegetation and exposing soil.

A damaging fire will potentially reduce rangeland values in the project area and surrounding ranchlands, having a negative, indirect economic effect on local ranchers and the community. The expansion of juniper and the distribution of fine fuels create a hazardous fuels environment that has the potential to burn with high fire behavior and spotting potential, jeopardizing adjacent private fuels reduction and timber harvest projects. A damaging fire will also jeopardize previous agency investments like the: 2008 Range Forage Improvement (Blue Fire Forest Recovery Project) in the West Valley and Outlet Allotments.

CUMULATIVE

Previous juniper felling treatments from past activities that left pockets of untreated juniper on the ground could potentially lead to high fire severity effects when a fire does occur. A rapidly spreading fire in the project area could move into and ignite areas of untreated, unpiled juniper in the West Valley allotment. The long burning duration (residence time) and contact of juniper bolewood with the ground allows for the downward heat transfer into the soil. The long burning duration and intensity will create fire disturbed areas with ash and exposed mineral soil. These conditions will be ripe for the invasion of cheat grass, medusa head and thistle. [6,10]

3.6.5 COMPARISON OF ALTERNATIVES

Predicted fire behavior was analyzed using BEHAVE Plus 5.[2,9] Outputs from BEHAVE show the projected fire behavior for each of the alternatives burning under 90th percentile weather conditions for the Modoc National Forest. Implementation of Alternatives 2 and 3 will reduce flame lengths, fire intensity, and rates of spread over the other two alternatives. Alternatives 2, 3 and 5 allow for direct attack of fire suppression resources, providing for a safer, more effective fire suppression operation with fewer acres burned.

	Flame Length (Feet)	Rate of Spread (chains/hour)	Fireline Intensity (BTU/Ft/S)
Alternative 1	9	70	767
Alternative 2	5	28	207

Alternative 3	5	28	207
Alternative 4	7	51	344
Alternative 5	5	28	207

Table 35: Comparison of Alternatives-BEHAVE

Alternatives 2, 3 and 5 will be consistent with management direction towards desired conditions by strategically placing fuel treatments that interrupt fire spread and achieve conditions that reduce the size and severity of wildfire, and provide for more effective fire suppression with fewer acres burned. The proposed action reduces the threat to wildlife habitat from severe wildfires by decreasing fire intensity, rate of spread and crown fire potential.

3.7 Heritage Resources

3.7.1 Introduction

This report identifies the background information necessary for considering the effects of a proposed undertaking on Heritage Resources. These are prehistoric and historic archaeological sites and features, collectively called "historic properties" if determined eligible for the National Register of Historic Places (NRHP), or if unevaluated, assumed to be eligible and managed as such. This is in compliance with the Section 106 provisions of the National Historic Preservation Act (as amended).

This report covers the Outlet, West Valley and Parsnip Range Allotments on the Warner Mountain Ranger District. They are considered in one report because they are each located in the southern Warner Mountains and share common boundaries.

3.7.2 Scope of Analysis, Methodology, and Indicators

The methodology used for this Heritage Resource section includes utilizing existing information on Native American tribal territory; historical background information from the overview prepared by William S. Brown Sr. (1945), the Forests' *Heritage Resource Inventory Base Maps* containing both previous acceptable archaeological coverage and recorded archaeological and historic site locations. Some previous archaeological surveys undertaken in the 1970s have not been entered into our base maps due to problems with the adequacy of the transect spacing and today's standards. The recorded archaeological sites are represented here, but not the unacceptable survey acres. Additionally, the District Range Conservationists provided information regarding areas of heavy or concentrated livestock use.

According to the Modoc National Forest Land and Resource Management Plan (1991) the following standards (S) and guidelines (G) are designed to facilitate proper identification and management of the Forests' cultural resources:

- (S) Inventory to identify cultural resource properties prior to any project, activity or license which may affect significant cultural resources consistent with the National Historic Preservation Act of 1966 (as amended) and other pertinent laws and regulations. Adjustments will be made to projects to comply with cultural resource laws.

- (S) Evaluate cultural resources to determine National Register of Historic Places eligibility.
- (S) Conserve properties that have been designated on, or are eligible for designation to, the National Register of Historic Places. (Eligibility is assumed if evaluation is incomplete.)
- (G) Provide for the use and enhancement of cultural resources for educational, scientific, recreational, and other public purposes to the extent consistent with management requirements.
    - Interpret significant cultural resources through signing, brochures, displays, self-guided tours, and programs. Treat and interpret significant cultural resources appropriate to their assessed value and associated level of public interest.
    - Continue cooperative efforts with local groups such as the Modoc County Historical society.
- (S) Protect access and use of sites and locations important to traditional Native American religious and cultural practices consistent with the American Indian Religious Freedom Act of 1978.
- (G) Protect cultural resources largely by directing activities or use away from sensitive areas, by maintaining confidentiality, and by informing Forest users of cultural resource protection requirements.

Desired Condition

The desired condition for most archaeological and historic resources is to limit or reduce site disturbance from livestock use so that archaeological and tribal values are not adversely affected. The sites should show little evidence of grazing effects – free of structural improvements (such as stock ponds, water troughs, developed springs, etc.) and non-structural features (such as "salt grounds"), and show very little trampling or soil compaction (as caused by livestock congregating, wallows, livestock trails, etc.), and other related features or activities that may lead to site degradation and loss or reduction of archaeological and tribal values. A reasonable monitoring program to document site condition and whether or not livestock use is affecting archaeological sites will be initiated. The sites will be monitored on an annual basis for three years, during which they will be examined for unacceptable effects due to livestock grazing. If unacceptable affects are documented, then corrective measures may be designed to reduce or mitigate the effects. The corrective measures may include constructing fence around the site boundaries to eliminate livestock access to these areas.

As per the Modoc National Forest LRMP archaeological sites should be evaluated for eligibility to the National Register of Historic Places. The determination of eligibility is a necessary step in developing reasonable management options and opportunities to facilitate other resource needs. If a property is determined to be "ineligible" for the NRHP, then the identified affects would not be considered adverse or significant and no mitigating measures would be required.

Monitoring for effects and NRHP eligibility determinations are long-term goals that may take place over the next 20 years, or more. Both require an adequate level of funding to be successfully implemented.

Analysis Results and Methodology

Field work in conjunction with this proposed grazing allotment permit began on June 13, 2011 and was completed on July 28, 2011. Two archaeological technicians with more than 20 years' experience each conducted the field checks, assisted by other archaeological technicians and aids.

Developed water sources in current use by grazing cattle were among the areas identified for field checks. Eleven water sources (of seventeen within the allotments) were examined. Three water sources already had adequate prior survey coverage and three others were not accessible. The sources are stock ponds (see Appendix, Map 2 for water source locations).

Water developments, such as stock ponds, troughs and exclusionary fences, are subject to archaeological survey before construction takes place. If a heritage resource property is found at a proposed development, the project is modified (generally relocated) to avoid impact to that site. While developments are not now placed within or adjacent to archaeological sites, some were inadvertently placed on sites in the 1960's and 1970's before archaeological survey was a regular practice in advance of such development. Salt licks on this allotment are changed regularly so were not deemed to be a significant factor potentially impacting heritage resource properties. It should be noted that domestic livestock are not the only herbivores using the water sources and salt licks; wild horses, deer and elk also gather there and contribute to the impacts.

Across the three allotments, sixteen archaeological sites were selected for field checks in 2011. These were chosen based on their proximity to water sources, where cattle gather in number and impact was most likely to occur. In addition, eight heritage resource properties were newly discovered and recorded. While examining the twenty-four sites, the field crew checked for these grazing impacts:

- Water troughs or ponds within sites, where cattle gather in number.
- Salt licks within sites.
- Deep hoof imprints made on wet ground by cattle.
- Cattle trails that are wider than 1 meter and/or more than 10 cm. deep, where the trails may be causing or contributing to erosion on sites.
- "Shade up" areas on sites where cattle tend to gather in number, churning the soil.
- Cattle dust wallows.

TRINOMIAL	FS NUMBER	GRAZING IMPACTS OBSERVED
CA-Mod-	FS-05-09-53-0020	Silty soil/soil churning at shade-up areas
CA-Las-1332/H	FS-05-09-53-0418/H	Cattle trail to a spring

Table 36. Previously recorded Heritage Resource Properties and grazing impacts.

Of the twenty-four heritage resource properties examined, two showed signs of potentially negative grazing impact. These impacts are described below.

FS-05-09-53-0020 [CA-Mod-]: Outlet Allotment. The site was initially recorded in 1972 as a "chipping station" of about 2 acres in size. In 2011 this site was re-recorded to bring the documentation up to current standard. It is a temporary camp of almost 20 acres in size. At least

two areas were noted where cattle "shade up" under trees and have perhaps been wallowing in dust. The soil in these areas is loose and silty.

Figure 13 (08/29/2011). Grazing impact at FS-05-09-53-0020: A "shade-up" area.

Figure 14 (08/29/2011). Grazing impact at FS-05-09-53-0020: A second "shade-up" area.

In this second area of grazing impact note the removal of the native vegetation cover compared to the background, where that vegetation is still intact.

FS-05-09-53-0418/H [CA-Las-1332/H]: Parsnip Allotment. This site was initially recorded in 1983 as a temporary camp with an area of 17.2 acres. It was re-recorded in 2011 at 33 acres. The grazing impact to the site consists of extensive, well-used cattle trails to a water source within the site. The trails are on a slope, which may contribute to the erosion of cultural materials within the site.

Figure 15: (08/24/2011). Grazing impact at FS-05-09-53-0418/H: Lithic material in a cattle trail.

Conclusion

Based upon the monitoring field observations at 24 of the archaeological sites, both previously recorded and newly recorded within the allotment, it appears that, at present, there is minimal "negative" effect to archaeological resources by livestock grazing activities. Two of the visited sites have effects more than just "general grazing" noted.

The "General Grazing" check-box on archaeological site records generally denotes evidence of livestock walking through sites leaving temporary hoof prints, minor livestock trails, and "cow pies." These tend to disappear after the long winter with the livestock off of the allotment. Large ungulates, such as elk, deer and antelope, that are present year-long, including those periods of wet to muddy soils, tend to do more impacts – transporting an occasional waste flake, or even a small projectile point – from here to there on the mud stuck to their hooves. This, however, is a process that has been on-going since time immemorial. It is part of the natural processes that affect sites and part of what has created the sites we observe today.

Livestock "trails" may be more substantial, but are generally less than 60 centimeters (24 inches) in width, but may be up to 10 centimeters (4 inches) in depth. As long as these well-established trails remain stable they tend to impact very little of most sites. For the most part the area of

direct impact is usually a fraction of 1% of the total site area. In fairly level terrain, with little erosion potential these trails do not constitute a major significant negative effect.

"Cow Wallows" may pose more of a significant negative affect by masking true house pit "depressions" and, in some cases, resulting in their obliteration by the loose, powdery soils filling in the archaeological depressions. On occasion crews have mistakenly recorded "wallows" as house pits and conversely not recorded actual house pit depressions assuming they were just cow wallows.

"Shade Trees" also may pose more of a significant negative affect by major churning of the soil, concentrating manure altering natural soil chemistry, and artifact breakage. The actual nature of the affect depends upon how intense the livestock usage is and the nature of the archaeological deposit. On archaeological sites with only one or a few such trees one management option may be to simply remove the trees so that livestock are no longer attracted to the site.

"Salt Licks" are blocks of salt placed within the range allotments to provide livestock with dietary salt. If placed within an archaeological site the concentration of livestock on the site may lead to significant negative effects due to trampling and churning of the soil. These areas also tend to have wallows associated with them. Mitigation measures include removing existing salt licks from within archaeological sites and having the range permittee coordinate with Heritage Resources to make certain future salt licks are not placed within archaeological sites.

"Watering Places" include stock ponds, troughs, tanks, guzzlers, developed springs, etc. to provide water for livestock. Livestock will congregate at these locations and are likely to cause significant affects. Affects may be avoided by making sure all new water sources are free from archaeological resources. At existing water sources where significant negative effects are noted then the affected archaeological site should have a National Register of Historic Places determination of eligibility undertaken to better assess the nature of the affects and determine appropriate mitigation measures if necessary.

"Fence lines" may affect archaeological sites directly by construction and construction personnel via the disturbance and/or illegal removal of surface artifacts and by subsequent creation of livestock trails along both sides of the fence. Also, in some areas of the Forest, in the past, fence lines were run through rock features, such as "rock rings", and rock stacks. Unfortunately, in some of these early fence building efforts rocks from the prehistoric features were removed and used in the construction of "rock jacks" to control wire tension. Another method previously used in fence construction included running a bulldozer blade-down to create a path with the fence constricted along one side. The bladed path then became a maintenance access road for the fence. Effects to archaeological sites may be avoided altogether by locating a "site free corridor" in which the fence line may be constructed.

The two visited sites with potentially meaningful negative effects noted are:

FS-05-09-53-0020 (CA-Mod-####) with on-going effects noted in the form of at least two "shade up" areas within the site. The nature of this noted disturbance is and the significance of potential negative effects is ambiguous as to whether or not this is a continuing problem. Therefore, under the provisions of Attachment 2 of the National Programmatic Agreement for Rangeland (1995), III.C.2c we are proposing to undertake limited-term monitoring of this site to

better understands the nature of the potential negative effects. Monitoring shall take place over a three year period to document the cause and nature of the affects. The monitoring standards set forth in III.D shall be followed. Based upon this monitoring information treatment measures will be designed to eliminate potentially negative effects following the standards in IV.A of Attachment 2.

FS-05-09-53-0418/H (CA-Las-1332/H) with on-going effects noted in the form of cattle trails leading to a water source on the site. The trails slope downhill and may be contributing the erosion of cultural materials. The nature of this noted disturbance is and the significance of potential negative effects is ambiguous as to whether or not this is a continuing problem. Therefore, under the provisions of Attachment 2 of the National Programmatic Agreement for Rangeland (1995), III.C.2c we are proposing to undertake limited-term monitoring of this site to better understands the nature of the potentially negative effects. The monitoring standards set forth in III.D shall be followed. Based upon this monitoring information treatment measures will be designed to eliminate potentially negative effects following the standards in IV.A of Attachment 2.

Monitoring stations have been established within each of these two sites – photographs were taken in the fall of 2013 at these locations. Photographs should be taken three times a year – before livestock are let on to the allotments, mid-grazing season, and immediately after livestock have been removed for the season. Three years of this monitoring should be sufficient to better understand the nature of livestock effects on these two archaeological sites. Based upon those documented observations if the livestock effects appear to be adverse then appropriate mitigation measures will be applied. These measures may include the construction of exclosure fences to keep livestock off of the sites.

Overall, the nature of livestock use within the Outlet, West Valley and Parsnip Allotments does not appear to have a meaningful negative effect on the majority of the archaeological resources present. The effects noted are primarily in the form of "general grazing" and livestock trails. Where potentially significant negative effects are noted management actions will take place to reduce, eliminate or mitigate those effects on properties that are or may be eligible for the National Register of Historic Places.

3.7.3 Affected Environment

3.7.3.1 Outlet Allotment

Eleven project-related surveys have been completed within the Outlet Allotment for a total of 621 acres. The surveyed portions of the Outlet Allotment contain 36 previously recorded heritage resource properties. As part of the Outlet Allotment examination, 10 of these sites were selected for field checks. These sites were selected based on their proximity to developed or natural water sources, as well as the quantity and quality of data available from the previous records.

Ten sites were proposed for field check. Out of these ten, two were found to be wholly on private land, despite map indications showing they were partially on Forest Service land. These two sites (53-0061/H and 53-0419/H) were relocated but not field-checked. Three of the field-checked sites (53-0020, 53-0183/0184, and 53-0379) were re-recorded to bring the information up to current standards. Sites 53-0183 and 53-0184 were found to be a single site based on the

continuation of cultural materials between them, so they were re-recorded as one site. Four sites (53-0243, 53-0244H, 53-0944 and 55-0945) were monitored. No additional heritage resource properties were newly discovered.

The Outlet Allotment, based on archaeological surveys conducted thus far, contains 230.34 acres of heritage resource properties recorded with 35 sites.

3.7.3.2 West Valley Allotment

Three project-related surveys have been completed within the West Valley Allotment for a total of 1,732 acres. All three surveys are concentrated within the north and central allotment areas, with no survey coverage in the southern portion. For this reason sample areas totaling another 202 acres within the southern allotment area were selected for additional survey.

The surveyed portions of the West Valley Allotment contain forty-one previously recorded sites.

As part of the West Valley Allotment examination, five of these sites were field checked and one was re-recorded. Sites to be field-checked were selected based on their proximity to developed water sources for livestock.

Three additional heritage resource properties were newly recorded within the West Valley Allotment.

The West Valley Allotment, based on archaeological surveys conducted thus far, contains 204.33 acres of heritage resource properties recorded within 44 sites.

Generally, over the past 30 years allotment management activities have been designed to avoid affecting cultural resources by designing and constructing improvements, such as fence lines, stock ponds, holding pastures, salt grounds, etc. away from known sites. Due to these efforts, it is believed that there has been an overall reduction of livestock concentration in areas of high archaeological sensitivity.

As specific future allotment improvements are planned, case-by-case inventories of those areas will take place in compliance with the National Historic Preservation Act to assure that these activities do not adversely affect significant heritage properties.

3.7.3.3 Parsnip Allotment

Two project-related surveys have been completed within the Parsnip Allotment for a total of 354 acres. Both surveys are located on the eastern edge of the allotment and neither contributes significant acreage to the survey total. For this reason sample areas totaling another 242 acres within the allotment were selected for additional survey.

The surveyed portions of the Parsnip Allotment contain two previously recorded sites. As part of the Outlet Allotment examination, both of these sites were field checked with one being re-recorded.

As part of the Parsnip Allotment examination, five previously unknown sites were found and recorded.

The Parsnip Allotment, based on archaeological surveys conducted thus far, contains 51.44 acres of heritage resource properties recorded within 7 sites.

Allotment	Total FS Acres	Arch Survey Acres	% of Allotment w/Arch Survey	# of Recorded Arch Sites
Outlet	5,155	621	12%	36
West Valley	5,277	1,934	36.9%	41
Parsnip	6,854	596	8.6%	7

Table 37: Heritage Resources For Three Range Allotments.

Allotment Name	Total (acres)	NFS lands (acres)	Percent Allotment on NFS lands
Outlet	5,606	5,155	91.9%
West Valley	5,351	5,277	98.6%
Parsnip	7,013	6,854	97.7%

Table 38: Total Area, NFS Lands (Acres) And Percent Of NFS Lands.

3.7.4 Environmental Consequences

3.7.4.1 Alternative 1

Term grazing permits would not be issued. Allotment Management Plans consistent with Modoc National Forest Land and Resource Management Plan and Sierra Nevada Forest Plan Amendment direction would not be implemented. Table 14 above displays total number of livestock that would not graze. Existing range improvements (e.g. fences, spring developments, stock ponds) would not be maintained by the current grazing permit holders. The allotment would change from active to vacant status.

Direct and Indirect Effects

Direct Effects

This alternative would have no direct effects on Heritage Resources, as it would result in no livestock grazing. However the removal of range improvements may require Historic Preservation compliance actions. This will be undertaken on a case-by-case basis.

Indirect Effects

The indirect effect of the "No Action" alternative would result from a lessening or elimination of site trampling, lateral displacement of surface artifacts (especially when livestock walk over a site in muddy ground conditions), and soil compaction attributed to general livestock grazing. However, some level of site trampling/lateral displacement/soil compaction would still take place as result of the existing large wildlife species (e.g., antelope, deer and elk). Another possible effect of no grazing may be the accumulation of ground vegetation – "fuels" for future wildfires. High fire temperatures have the potential to affect obsidian artifacts by altering or destroying the obsidian "hydration" rind that is useful in dating the age of archaeological sites.

The act of seasonal grazing and reducing the vegetation (potential fuels) may actually have some potential benefit to the archaeological resources present.

Cumulative Effects

This action would most likely result in an overall reduction of site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to the elimination of livestock. It is also possible that an associated increase in surface vegetation, primarily grasses, may result in the reduction of ground surface visibility, making the surface identification of archaeological remains (e.g., surface lithics) more difficult. This reduction surface visibility, however, may result in increased site protection from "pot hunters" because they can no longer easily see surface artifacts. As noted above, this accumulation of vegetation may act as "fuels" for wildfires whose high temperatures may adversely affect obsidian artifacts.

3.7.4.2 Alternative 2

Direct and Indirect Effects

Direct Effects

This alternative would result in a continuation of current effects on Heritage Resources. This action may result in on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction due to livestock grazing. It is also possible that it would keep surface vegetation, primarily grasses, in present condition, allowing for the continued surface identification of archaeological remains (e.g., surface lithics). This surface visibility also allows for "pot hunters" to easily see surface artifacts and subject them to illegal collection. Fence construction, if necessary, would take place outside of defined site boundaries, therefore would have no direct effect upon the sites.

Indirect Effects

Indirect effects may subject archaeological sites to some level of site disturbance and slow degradation. However, the reduction in surface vegetation (fuels) may have a beneficial effect of lessening the potential for high temperature wildfires affecting surface obsidian artifacts. Construction of fences around archaeological sites, should that become necessary to eliminate grazing impact may have the unintended effect of making the site locations more obvious and therefore more subject to unauthorized collection or other human disturbance.

Cumulative Effects

This action would most likely result in some level of on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to the continuation of livestock grazing. It is also possible that an associated continued *reduction* in surface vegetation, primarily grasses, will result in the continued ground surface visibility, making the surface identification of archaeological remains (e.g., surface lithics and artifacts) relatively unhindered. This surface visibility may also allow for "pot hunters" to easily see surface artifacts and subject them to illegal collection. Overall, livestock grazing and large hooved or footed animals have and continue to affect archaeological sites across the Forest by various means depending upon soil conditions, site types, and various other factors. Large hooved or footed native mammals and rodents/burrowing animals, have affected sites in one way or another "since time immemorial" and will continue to do so to the end of time. Over time, fence construction may contribute to the

disappearance of some cultural materials from the site surface by making the site locations more obvious and subject to illegal artifact removal. Past and future wild fires have the potential to adversely affect obsidian hydration values of surface and immediately subsurface artifacts. Generally, too, the more people out and about the land as contractors for various undertakings, Forest Service employees, fire suppression crews, recreationists and hunters, will result in continuing artifact loss through illegal removal of visible surface artifacts and a lessening of archaeological research potentials.

3.7.4.3 Alternative 3

Direct and Indirect Effects

Direct Effects

This alternative would result in a continuation of current effects on Heritage Resources, the similar to the Proposed Alternative, however by more than doubling the number of livestock (up to the actual "permitted" level) than have grazed in the past the level and intensity of effect would most likely increase. This action may result in increased on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to livestock grazing. It is also possible that it would keep surface vegetation, primarily grasses in present condition, allowing for the continued surface identification of archaeological remains (e.g., surface lithics). This surface visibility also allows for "pot hunters" to easily see surface artifacts and subject them to illegal collection. Overall, livestock grazing and large hooved or footed animals have and continue to affect archaeological sites across the Forest by various means depending upon soil conditions, site types, and various other factors. Large hooved or footed native mammals and rodents/burrowing animals, have affected sites in one way or another "since time immemorial" and will continue to do so to the end of time. Over time, fence construction may contribute to the disappearance of some cultural materials from the site surface by making the site locations more obvious and subject to illegal artifact removal. Past and future wild fires have the potential to adversely affect obsidian hydration values of surface and immediately subsurface artifacts. Generally, too, the more people out and about the land as contractors for various undertakings, Forest Service employees, fire suppression crews, recreationists and hunters, will result in continuing artifact loss through illegal removal of visible surface artifacts and a lessening of archaeological research potentials.

Indirect Effects

Indirect effects may subject archaeological sites to some level of site disturbance and slow degradation. However, the reduction in surface vegetation (fuels) may have a beneficial effect of lessening the potential for high temperature wildfires affecting surface obsidian artifacts.

Cumulative Effects

This action would most likely result in some increased level of on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to the continuation of and increase number of livestock grazing. It is also possible that an associated continued *reduction* in surface vegetation, primarily grasses, will result in the continued ground surface visibility, making the surface identification of archaeological remains (e.g., surface lithics and artifacts) relatively unhindered. This surface visibility may also allow for "pot hunters" to easily see surface artifacts and subject them to illegal collection. Overall, livestock grazing and large hooved or footed animals have and continue to affect archaeological sites across the Forest by

various means depending upon soil conditions, site types, and various other factors. Large hooved or footed native mammals and rodents/burrowing animals, have affected sites in one way or another "since time immemorial" and will continue to do so to the end of time. Over time, fence construction may contribute to the disappearance of some cultural materials from the site surface by making the site locations more obvious and subject to illegal artifact removal. Past and future wild fires have the potential to adversely affect obsidian hydration values of surface and immediately subsurface artifacts. Generally, too, the more people out and about the land as contractors for various undertakings, Forest Service employees, fire suppression crews, recreationists and hunters, will result in continuing artifact loss through illegal removal of visible surface artifacts and a lessening of archaeological research potentials.

3.7.4.4 Alternative 4

Direct and Indirect Effects

Direct Effects

This alternative would result in a slight reduction of current effects on Heritage Resources as a result of fewer livestock within the West Valley Allotment. This action may result in on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to livestock grazing. It is also possible that it would keep surface vegetation, primarily grasses in present condition, allowing for the continued surface identification of archaeological remains (e.g., surface lithics). This surface visibility also allows for "pot hunters" to easily see surface artifacts and subject them to illegal collection. Overall, livestock grazing and large hooved or footed animals have and continue to affect archaeological sites across the Forest by various means depending upon soil conditions, site types, and various other factors. Large hooved or footed native mammals and rodents/burrowing animals, have affected sites in one way or another "since time immemorial" and will continue to do so to the end of time. Over time, fence construction may contribute to the disappearance of some cultural materials from the site surface by making the site locations more obvious and subject to illegal artifact removal. Past and future wild fires have the potential to adversely affect obsidian hydration values of surface and immediately subsurface artifacts. Generally, too, the more people out and about the land as contractors for various undertakings, Forest Service employees, fire suppression crews, recreationists and hunters, will result in continuing artifact loss through illegal removal of visible surface artifacts and a lessening of archaeological research potentials.

Indirect Effects

Indirect effects may subject archaeological sites to some level of site disturbance and slow degradation. However, the reduction in surface vegetation (fuels) may have a beneficial effect of lessening the potential for high temperature wildfires affecting surface obsidian artifacts.

Cumulative Effects

This action would most likely result in some level of on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to the continuation of livestock grazing. It is also possible that an associated continued *reduction* in surface vegetation, primarily grasses, will result in the continued ground surface visibility, making the surface identification of archaeological remains (e.g., surface lithics and artifacts) relatively unhindered.

This surface visibility may also allow for "pot hunters" to easily see surface artifacts and subject them to illegal collection.

3.7.4.5 Alternative 5

Direct and Indirect Effects

Direct Effects

This alternative would result in a continuation of current effects on Heritage Resources, the similar to the Proposed Alternative, however by more than doubling the number of livestock (up to the actual "permitted" level) than have grazed in the past the level and intensity of effect would most likely increase. This action may result in increased on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to livestock grazing. It is also possible that it would keep surface vegetation, primarily grasses in present condition, allowing for the continued surface identification of archaeological remains (e.g., surface lithics). This surface visibility also allows for "pot hunters" to easily see surface artifacts and subject them to illegal collection.

Indirect Effects

Indirect effects may subject archaeological sites to some level of site disturbance and slow degradation. However, the reduction in surface vegetation (fuels) may have a beneficial effect of lessening the potential for high temperature wildfires affecting surface obsidian artifacts.

Cumulative Effects

This action would most likely result in some increased level of on-going site disturbances due to trampling, lateral displacement of artifacts, and soil compaction, due to the continuation of and increase number of livestock grazing. It is also possible that an associated continued *reduction* in surface vegetation, primarily grasses, will result in the continued ground surface visibility, making the surface identification of archaeological remains (e.g., surface lithics and artifacts) relatively unhindered. This surface visibility may also allow for "pot hunters" to easily see surface artifacts and subject them to illegal collection. Overall, livestock grazing and large hooved or footed animals have and continue to affect archaeological sites across the Forest by various means depending upon soil conditions, site types, and various other factors. Large hooved or footed native mammals and rodents/burrowing animals, have affected sites in one way or another "since time immemorial" and will continue to do so to the end of time. Over time, fence construction may contribute to the disappearance of some cultural materials from the site surface by making the site locations more obvious and subject to illegal artifact removal. Past and future wild fires have the potential to adversely affect obsidian hydration values of surface and immediately subsurface artifacts. Generally, too, the more people out and about the land as contractors for various undertakings, Forest Service employees, fire suppression crews, recreationists and hunters, will result in continuing artifact loss through illegal removal of visible surface artifacts and a lessening of archaeological research potentials.

Compliance with the Forest Plan and Other Regulatory Direction

Each alternative would be subject to the same Forest LRMP standards and guidelines, which are designed to comply with existing Historic Preservation laws (e.g., National Historic Preservation Act), rules and regulations.

3.8 Hydrology

3.8.1 Introduction

This section detail findings on existing condition of hydrologic condition of stream corridors and uplands, impacts of five action alternatives under consideration, and design features or mitigations that will bring some of the stream corridor riparian zones into an upward trend that are currently non-functional or functional-at-risk according to lotic assessments conducted on site.

The proposed action authorizes livestock grazing on the 3 aforementioned range allotments. Numbers of animal units would remain the same on Outlet and Parsnip allotments and be reduced on West Valley allotment by 56%. Certain revisions to current practices on the allotments are proposed to improve range and riparian conditions, particularly riparian areas that are currently rated functional, but at risk. These improvements are thinning juniper on upland range and riparian areas and install fencing around a fen on the West Valley allotment.

Four additional alternatives provide variations on the proposed alternative, Alternative 2. Alternative 3 allows for juniper thinning on uplands, but keeps current permitted numbers of AUMs in West Valley Allotment. Alternative 4 does not include upland juniper thinning, but reduces permitted AUMs on West valley Allotment.

3.8.2 Scope of Analysis, Methodology, and Indicators

Field visits to the allotments were between July 24th and 27th, 2011. Traverses were made across the uplands, with toe transects taken for cover density and vegetation type. Greenline surveys were conducted along each stream reach that was assessed by the proper functioning condition method to ascertain seral stage of riparian vegetation (see Range report for details). Proper functioning condition assessments were conducted on 5 reaches in Outlet and Parsnip allotments to follow up on previous assessment made in 1999. Protocol for the assessments is outlined in Technical Report 1737-15 (BLM, 1998).

Cumulative Watershed Effects assessment was accomplished with the ERODA spreadsheet based program. The ERODA program was developed on the Eldorado National Forest, and is currently being used, or a modification thereof on the Shasta-Trinity National Forest.

3.8.3 Affected Environment

Climate

The dominating factor in the climate of California is the semi-permanent high pressure in the north Pacific. In the summer the high keeps storm tracks well to the north of the state, creating the typical droughty summer. In the winter it moves southward allowing storms to move in from the west. Total annual precipitation for the southern 3 allotments is 13-21 inches, but for the 6th Hydrologic Unit Code (HUC) containing the allotments, total precipitation is as much as 37 inches at the crest of the Warner Mountains. Vegetative cover type on the 3 allotments is juniper and sagebrush grasslands with conifer stands confined to the ridgelines or valley bottoms. Aspen stands are small, scattered and almost entirely in streamside riparian zones.

Precipitation intensity reflects the relative mildness of Pacific Northwest storms in general. The 2-year 6-hour rate in the project area is calculated as between 0.8 to 0.9 inches, with small incremental steps between frequency of occurrence so that a 100-year 6-hour rate is about double that of the 2-year. Precipitation statistics are only available from valley stations, but an examination of Jess Valley in the south Warner Mountains and Fort Bidwell in north Surprise Valley shows that snowfall is mostly in winter and spring and comprises about one third to one half of total precipitation. This ratio probably favors snowfall over rainfall in the higher elevations. It is expected that snowfall is predominant in the project allotments and that snowmelt is the principle source of stream flow.

Stream Flow Record

About 20% of watershed of the South Fork Pit River, gaged at the Forest Boundary (USGS Station # 11345500), is through West Valley Reservoir therefore the record is moderated by this regulation of flow (USGS website: http://waterdata.usgs.gov/usa/nwis/sw). Annual peak flow and 63% of the volume of flow is typically snowmelt in the months of March through June. Minor peaks frequently occur in the late fall or mid-winter months from passing warm fronts.

Stream Corridor (Lotic) Condition

Proper Functioning Condition Assessment

Lotic proper functioning condition assessments were performed on 5 stream reaches, 3 on South Fork Pit River in the Outlet allotment (reaches 311-313),and 2 on the Parsnip allotment (Reaches 325 on Parsnip Creek and 331 on Little Parsnip Creek) (Figure). The assessments were follow-up to assessments conducted by forest staff in 1999 and as such may be used to indicate trend in condition (Table 5).

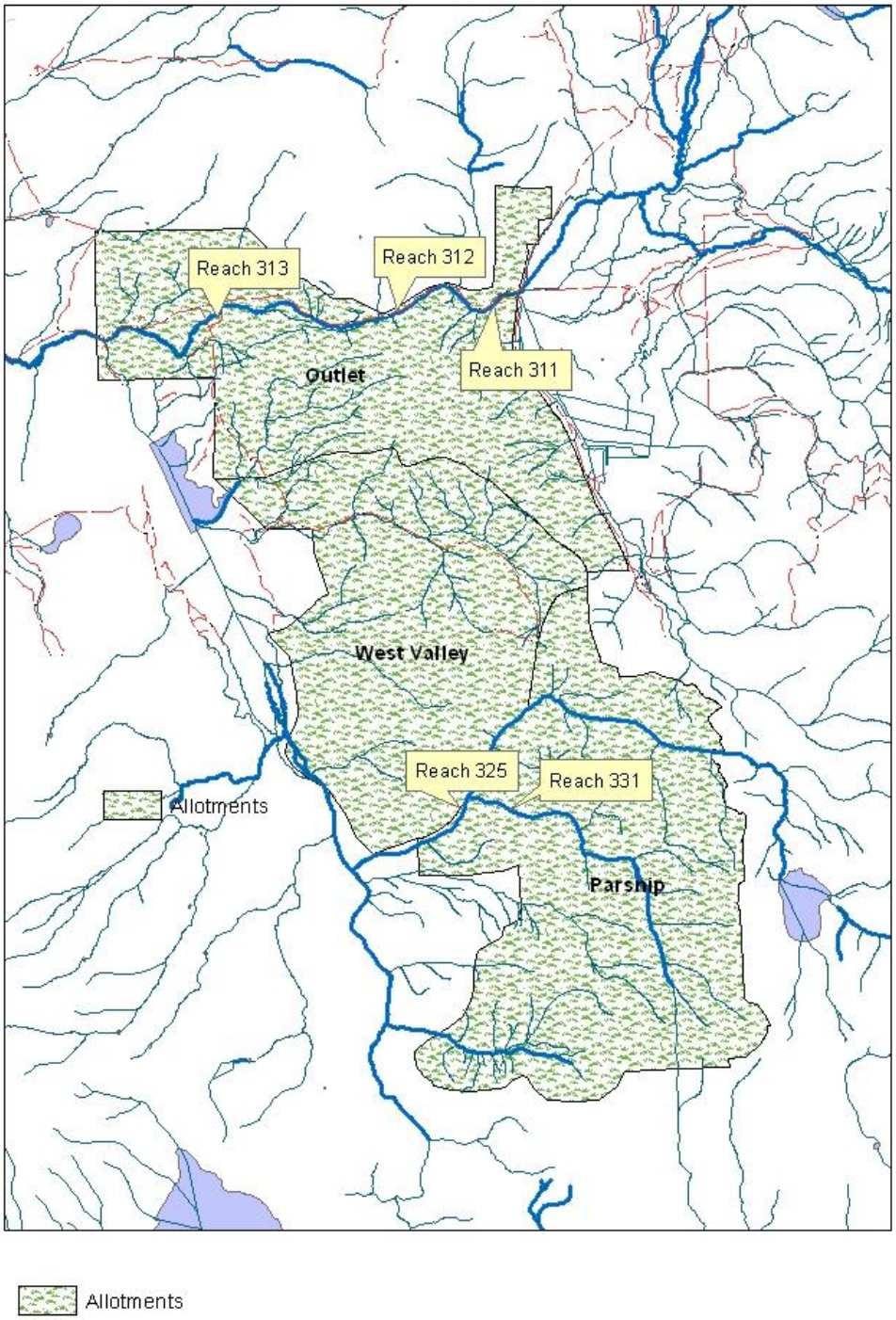


Figure 16: South Warner Allotments and PFC Reaches.

South Fork Pit is a perennial stream draining Jess valley and its headlands through a narrow gorge that forms the north boundary of the Outlet allotment. The flow at the time of visit was just above incipient flooding, and some high water channels were still active in the lower reach (313).

Beginning at the upstream reach (311) which exits Jess Valley the stream is a relatively low gradient unconfined channel with a broad floodplain that is, practically speaking, the entire valley bottom. There is evidence of historic degradation, lowering of bed that has left a high proportion of unstable and un-vegetated banks (Figure).

Figure 17: Reach 311, South Fork of Pit River.

The banks have been trampled by livestock in places so that portions have collapsed over one-time undercuts. It is unlikely that the flood stage inundates the valley bottom, but it may have once done so frequently. Portions of the bank-top have berms that appeared pushed-up mechanically (the cross-section exposed in the berms lack any signs of horizontal development typical of valley soil). If the channel were constrained from spreading out during runoff then energy would have been directed downward against the bed. There are as yet no overt signs in valley vegetation of a drop in water table that would be expected with lowering of the stream bed. The vegetation on the banks is largely mid-late seral with a dense willow component. Water temperature was measured by hand as 20° C (68° F) (1700 hours. July 24th, 2011) a relatively high temperature considering mountainous headlands and most probably a function of long un-shaded travel through Jess Valley. A small spring at the base of a basalt bluff near the valley bottom of the reach had a water temperature of 12° C at about the same time.

This reach was designated as Functional-at-Risk with an upward trend on the merits of robust riparian vegetation community that shows diverse composition and age class. A new floodplain level is developing some feet below present top of bank so a degree of stability with respect to bed elevation appears to have been reached.

Downstream of Reach 311, Reach 312 is a steep gradient channel in a gorge like valley. Channel morphology s dominated by cascade-like riffles, and has a large cobble substrate. Gradient is probably between 3 and 5 percent. Much of the larger material in the channel is colluvium from hill slopes which are largely boulder talus covered. The banks are low and well armored with mature community of cottonwood, aspen, pine and willow, as well as cobble and boulders. This reach was designated as Proper Functioning Condition with no apparent trend in condition, either upwards or down.

Figure 18: Reach 313, South Fork of Pit River.

Reach 313 is difficult to characterize because it is not entirely clear what the channel type should be. The reach may have been aggraded historically, at least in the upper half, as it has not only a multi-threaded anatomose pattern, but occasional small sediment fans in the floodplain area (Figure). It is possible the aggradation was from material eroded from banks of Reach 311 and upstream in Jess Valley. Peat was mined from the bottom of Jess Valley for much of the 20th

century (W. Reading, personal communication, 2011). That action and livestock grazing on valley pastureland, or land in pasture subsequent to peat extraction undoubtedly had exacerbating effects on runoff.

What is clear at the present time is that the floodplain area is eroding, and probably was doing so prior to this year's above average runoff. The valley form is a broad, shallow U, with short hill slopes of not over 200 feet distance to the crest. In any case the channel is not constrained much from laterally spreading. That is, width would increase faster than depth at least in early stages of high flow event. Downstream of the FR 39N19 bridge the channel and valley changes character quickly gaining slope and moving into a steep sided valley without any evidence of aggradation or lateral scour.

A second interesting feature of Reach 313 is that a large component of the understory canopy is western juniper under a scatter of large ponderosa pine. There is a minor component of cottonwood of a single, narrowly defined age class that is probably historic. Cottonwood re-generate typically from less frequent flood stages, higher than an average annual peak. It would fit if the channel aggraded in a single or shortly spaced series of events that the present cottonwood gallery would date from that time. The willow component is distinctly bimodal in age class; a mature, even decadent portion and a young or sprouting portion that does not show much sign of browse at least in the current year. This could be an indication that livestock pressure has eased in recently.

The juniper component is more problematic. It could indicate an era of severe disturbance of riparian zone by livestock. A last note is the relative merit of cover type species to scour. The root crown of the juniper on the top of bank or near hill slope area is frequently scoured of soil, but not so for other woody types such as the willow, cottonwood or pine (Figure). This reach was designated Functional-at-Risk with a downward trend. Riparian treatments to help arrest further degradation of the floodplain are discussed below in section on impact analysis of proposed action.

Figure 19: Scoured Juniper Root Crown, South Fork Of Pit River.

Reach 331, Little Parsnip Creek is really at least 2 distinct morphologies and if a short meadow reach in the middle is considered, it is 3. Perennial flow begins in Little Parsnip Creek at an unmapped spring in the NW ¼ of Section 12 Township 30 north, Range 14 east. Flow was estimated at >0.5 cubic feet per second (cfs) at time of visit. Water temperature at emergence was 13° C (55°F). This is a somewhat high temperature for spring water in a cool climate with spring snowmelt as the dominate runoff season. Basalt typically provides for deep percolation of precipitation water not intercepted, evaporated or transpired. Springs at contact planes between lava flow members or fault lines are common. Spring water temperatures usually approximate mean air temperature at the time of precipitation (including snowmelt). Most soil moisture flux beyond the rooting zone is during highest precipitation season, or in the case of the local area, snowmelt.

A quarter mile downstream of the spring a tributary with flow estimated at 0.25 cfs joins from the east. The main stem channel is very wide and shallow, almost a dispersed flow; the substrate is sub-rounded to sub-angular cobble and gravel, and gradient is moderate. The water is slightly turbid, though probably within any water quality standards, the source was not precisely determined. There is a high degree of livestock trampling around the springs, but it is also in the author's experience that groundwater flow through ash tuffs can lend a small degree of persistent cloudiness. While no tuffs were exposed at the springs, pyroclastic volcanic rock could be inter-layered with the flood flow basalts.

Over the next one to one and a quarter miles in the downstream direction, the valley form is broad and shallow, the bottom often convex skyward with a subtle hummocky topography from overlapping sediment fans. The channel pattern is multi-threaded, though not braided, a pattern

created as dispersed flow will break and coalescence in and around rises and dips in valley bottom (Figure18). In other words, the pattern is probably imposed on the stream by sediment fans deposited by debris flow, not transported by more conventional flood flows.

Figure 20: Reach 331, Upper Parsnip Creek.

The channels are only faintly incised into valley fill, with a narrow floodplain along the edges, only half a foot or so above water surface on the day of visit. There is an immediate impression on the observer of early surface flow development. The over story is provided by a stand of old, very large ponderosa pine. The valley's inaccessibility has protected it from logging, but as in the South Fork Pit River, there is dense understory of juniper, and under-development of riparian woody species. Willow is almost entirely absent. The floodplain is heavily trampled by livestock, and clearly some of the channels are simply trailing that has captured flow, such that these incipient paths have yet to erode down to base level of the main stem. It is not a stretch of imagination to see that the valley may not have had perennial flow, but persistent cattle trailing up the middle has touched off some amount of scour that has captured high water table (especially in above average years) and created surface flow, where a hummocky perhaps seepy swale once existed. The flow does not gain appreciably downstream so the springs may be the primary source of flow throughout the valley length. Whatever the actual case there is little doubt that livestock trailing essentially up the riparian corridor has stunted riparian community to

a perpetual early seral state, and as in South Fork Pit River it is probable that severe surface disturbance has resulted in juniper encroachment.

The lower half of Little Parsnip is in an increasingly deep canyon, the channel confined between hillsides. Livestock trails keep to the side slopes for the most part, and the overall use seems substantially less, and the principle drive trail may go up on top the ridge at some point. Except for a minor proportion of the channel and riparian bottom that is accessible to cattle, the condition is much better than in the upper half. Over a short reach –100 feet—at some point in the past small trees or brush were chopped down with an ax and laid over lower hill slopes above the channel, probably to deter cattle from approaching the stream, which appeared to have worked well. Over the last half mile upstream of the confluence with Parsnip Creek, the riparian community is largely in late seral condition, mature willow cottonwood and aspen dominate with a thin overstory of ponderosa pine. The channel character changes to a steeper, step-pool profile. Talus slopes are frequent on the hill sides and reach down to the valley bottom. Flow at the confluence was estimated between 1 and 2 cfs, water temperature of 13° C, and slightly turbid. This reach in its entirety was designated Functional-at-Risk with no apparent trend on the basis of the condition of the upper half. The upper half on its own however should be rated Non-Functional with a downward trend. The lower half may be classified as Proper Functioning Condition.

Main stem Parsnip (Reach 325) is similar to bottom half mile of Little Parsnip, albeit on a much larger scale, with a flow estimated at about 20 cfs on the day of visit. Water temperature was 16° C (61°F), which most probably reflects influence of a lengthy valley with only partial canopy, though a tributary spring of a few gallons per minute issuing from a swale valley, almost certainly following a fault line, has a water temperature of 26° C (79°F). This raises a further possibility that water temperature in area streams may be influenced by high geothermal gradient.

The main stem Parsnip Creek within the Parsnip allotment is in a gorge with steep hill slopes often boulder talus covered. The channel is usually single-threaded, but may be multi-threaded where avulsed by debris or sediment such as medial bars. At the time of visit the stage was 0.5 to 1.0 foot below floodplain height, though the channel is not deeply incised and constrained laterally by the valley side slopes themselves. Width to depth ratio is under 15, channel and floodplain width together is usually less than 50 feet. Gradient is relatively steep, probably averaging over 3 percent, with cascade-like riffle sets, although not steep enough to develop true step-pool profile. The substrate is gravel/cobble with small boulders mostly of colluvial origin, collecting in the riffles.

Overstory cover from scattered juniper and ponderosa pine is about 30 percent. The banks have mostly mature cover of willow, cottonwood and other shrub or herbaceous riparian plants. Access by cattle is very limited, although in the upstream 2/3 mile portion they do make it in where the aforementioned swale tributary confluences. Channel morphology is the same as described above, though there is evidence of cattle on the floodplain there is no evidence that it is detrimental to channel morphology or water quality. The vegetation community shows high diversity in age classes and composition. Above all the reach is both very resilient and highly resistant to change. This reach was classified as Proper Functioning Condition with no apparent trend.

Reach	1999 Rating	1999 Trend	2011 Rating	2011 Trend
311-SF Pit R.	PFC	Not Apparent	Functional-at-Risk	Upward
312-SF Pit R.	PFC	Not Apparent	PFC	Not Apparent
313-SF Pit R.	PFC	Not Apparent	Functional-at-Risk	Downward
325-Parsnip C.	PFC	Not Apparent	PFC	Not Apparent
331-L. Parsnip C.	PFC	Not Apparent	Functional-at-Risk	Not Apparent

Table 27: Results of Proper Functioning Condition Survey.

Other Riparian Areas

The West Valley allotment has an unnamed stream that is incised—a gully a few feet and up to twenty feet deep—into a mostly loam valley fill (Figure 21).

Figure 21: Unnamed stream, West Valley Allotment.

The banks of the gully are mostly vertical or near vertical owing to the cohesive qualities of the loamy material even if dry. Flow at the time of visit was a fraction of a cfs and point of origin was around the West Valley Spring. Above this point although the valley bottom was still incised by the channel it was likely ephemeral flow. The valley bottom was probably a one-time

meadow, dry above West Valley Spring, but perennially wet below. A fen, about 1/10 of an acre in extent is all that remains of any wetland. It is a grassy mound just above a valley constriction (north 41° 12.126', west 120° 22.858), that may be caused by upwelling of groundwater flow over bedrock, which is exposed in the channel 30 feet away. In the potion below West Valley Spring, exposed banks clearly show a dark mollic soil layer in the top 1 to 2 feet which indicates a long-time grassland and a high degree of at least seasonal wetness (Figure 22).

Figure 22: Unnamed stream, West Valley Allotment, Mollic Soil Profile.

Valley bottom cover is now dense juniper, annual grasses and sage, though most of the junipers have been recently removed. Only those perceived integral to bank stability were left. Degradation of the channel is historic, judging by the age of juniper in the bank. There are a few

older ponderosa whose position indicate at least above West Valley Spring there may have been an incised channel though much shallower than present.

The bedrock exposed in the bottom of the channel in the vicinity of the fen and downstream of that point provides a kind of gradient control, although it is a soft, low density rock and further degradation should be expected. The steam has already cut through a foot or more of the rock, again in historic time. The rock is a sedimentary deposit, mostly composed of a volcanic ash matrix with small sand-size detrital grains from other pre-existing rock. The environment of deposition could have been a lake or basin. Very thin beds of a chalky material (diatomite?) occur on previously weathered surfaces of the ash deposit, which might have deposited in a lake environment. A thin layer of cobble and gravel is exposed near the bottom of the channel, just above the bedrock, in the lower portion where the valley constricts. At the time of visit there was a continuous seep from this layer, probably groundwater flow from the nearby hill slope. Water temperature from seeps was 13° C and helps maintain reasonably good water quality in the channel.

A floodplain has re-developed in the bottom of the gully with a very robust riparian community typically in a mid to late seral stage—sedges, grasses, rushes and willow. The width and vigor of the riparian zone appears adequate to dissipate flooding such as it might occur. Small head cutting is on-going in the bottom of the channel up to West Valley Spring. Treatment of the head cuts would slow process of degradation. Juniper in the riparian area of the channel in the West Valley Spring area could be fallen to inhibit cattle ingress. In this reach the channel is not as deeply incised and livestock trampling of the floodplain is evident.

Upland Condition

For detailed discussion of vegetation type and implications of livestock use see range conservation report. These factors don't necessarily translate in greater soil infiltration capacity, nor is that as important as physical cover and soil strength to resist the effects of raindrop impact. Tests with mini-disk infiltrometers on West Valley and Parsnip allotment gave infiltration capacity of 5 to 8 inches per hour, well in excess of predicted rainfall intensities for the area (see Climate section). But the impact force of raindrops, which increase with increasing intensity due to proportional rise in raindrop size, is one to two orders of magnitude beyond the cohesive strength of most soils. It is this action on bare mineral soil, which creates soil crusting, plugs interstitial surface pores leading to surface ponding and surface runoff.

Overt signs of surface erosion were noted on Outlet and West Valley allotments in the form of soil pedestals on highly fragmented relict soil "A" horizon. However, whether the apparent pedestals were formed by recent, historical erosion is not clear, but neither are flow patterns between elevated tussocks. It is also possible that one time erosion was principally by wind. Rilling or incipient gully forms were not observed on any of the allotments, nor would be expected given the degree of stoniness.

Cover by litter rock and live vegetation was well above regional guidelines on all the allotments, by 25-35% (see Range report), and live cover predominated.

Despite the presence of annual grasses and juniper invasion uplands were in satisfactory ecological status overall. However, continued juniper encroachment could lead to downward trends in the long-term. In regards of hydrologic condition the uplands are considered here as functional, as not necessarily leading to runoff or sediment delivery that would destabilize channels. There is sufficient cover to preclude surface erosion by water, and inherent qualities of surface infiltration capacity to transmit precipitation as ground water to the major channels.

There is obvious and extensive juniper encroachment throughout the allotments and the various topographies and ecosystems, from the rocky and shallow soil mesa tops, deep soil of the grassy meadows, and valley fill riparian zones. Juniper dominant communities do not support the extent of grass cover, or forage species in general that the sage communities do, and have more bare ground, or patchiness than sage communities. It is still a question whether the patchiness precedes juniper invasion, for instance due to one-time overgrazing, or if the patchiness is caused by the juniper. Despite persistent beliefs that juniper "dries" a site out, soil moisture does not vary significantly from sage/bunchgrass or Juniper/bunchgrass communities, although it may seem intuitive due to the increased patchiness. Junipers pre-settlement were largely on very rocky soils, ridge tops or within outcrops. The oldest and largest junipers are still within these distinct ecotypes.

Recurrent fire suppresses juniper growth. Conversely livestock grazing has an opposite if small effect to accelerate spread. Likewise big mountain sagebrush growth is at least not retarded by grazing. In general grazing does not inhibit growth and spread of woody species, neither is it clear that it accelerates density of woody species. Relict grasslands, even with lack of fire, retain greater diversity (less woody species density), though not typically any significant difference in total ground cover.

3.8.4 Environmental Consequences

Grazing livestock directly compact soil and reduce vegetation cover mostly through reduction in grass and shrub canopy extent. Reduction of canopy may reduce losses in water budget. Rainwater and snow that adhere to canopy is largely lost to evaporation. Loss rates from grasslands are similar to forest stands, higher with low intensity events but averaging about 70% of all intercepted precipitation. However the increase of rainfall impact onto bare mineral soil may cause overland flow as rills and sheet wash. Aside from potential erosion risk, surface flow is also water not typically available to plants.

Advent of overland flow may locally increase peak flow in natural channels which induces a complex series of changes to channel morphology, depending on nature of valley fill and bed substrate. Channels may scour if increases in water depth routinely exceed resistance of bed material, this is particularly true in reaches with fine grain alluvium such as meadows. Increased channel depth is eventually followed by bank collapse and channel widening.

Livestock may also simply trample banks, particularly where riparian vegetation has been reduced or eliminated. Sediment entering the stream through bank collapse may similarly cause channel widening.

Water quality parameter most affected by grazing is typically temperature, which may be increased because of loss of riparian vegetation cover. Nutrient compounds of nitrogen from

surface runoff may also increase. These compounds encourage aquatic plant growth, under favorable conditions of sunlight and water temperature. Plant growth depresses dissolved oxygen content in the water, a critical factor for aquatic organisms particularly fish and invertebrates that are their main diet.

3.8.4.1 Alternative 1

Direct and Indirect Effects

The No Action alternative would be the cessation of livestock grazing on the allotments. The direct effects of cattle are trampling of sensitive areas such as channel banks and compaction or perturbation of soil. It is expected that ground cover through vegetation would increase, particularly of grasses and forbs (see Range report). It is already noted above that overt signs of erosion are not apparent for reasons of sufficient ground cover, stoniness of soil and generally gentle slopes.

Hydrologic function such as infiltration capacity and hydraulic conductivity of top soil may improve, but these factors at present are not significant in themselves for erosion. Some trends—spread of juniper and sage in uplands and juniper in riparian areas would likely continue. It is possible that the juniper undergrowth poses a fire risk to old growth pine stands on upper Little Parsnip Creek. Corrective actions to protect the stand through thinning of the juniper in the riparian zone would not be taken.

Trampling of floodplain area in unnamed West Valley steam would cease, but head cutting would continue without treatment.

Effects to water quality would most probably include reduction of sediment delivery to perennial channels where livestock are obviously a current source of instability. It is not evident if sediment rates from upland areas would be affected, or if they are appreciably above natural condition. Effects to stated impairments of pH and salinity would be unknown.

Cumulative Effects

Cumulative watershed effects were assessed using the ERODA program, developed on the Eldorado National Forest. The program is spreadsheet based and is an index or listing of features—roads, harvest activities, grazing land and so forth, known to affect watershed condition by altering runoff pattern or sediment load of streams. The general methodology and spreadsheet format is common to Region 5 National Forests.

The process is straightforward; the numbers of acres of each category of feature is multiplied by coefficients that equate the feature to a road acre. For example, an acre of clear cut forest may be determined to have the impervious characteristics of a ¼ acre of road surface, so a coefficient of 0.25 would applied to this category. The program gives results in percent Equivalent Road Acre (%ERA). Thresholds of concern (TOC) are determined for each watershed through another spreadsheet process that considers stream pattern and shape of the watershed, road density and channel stability. Those of the project area are between 12 and 18 % ERA, beyond which it is assumed detrimental effects to watershed condition might occur. The effects are not specified, nor are the precise nature of the causal agent(s), though weighting each item to an impervious

road surface implies runoff.

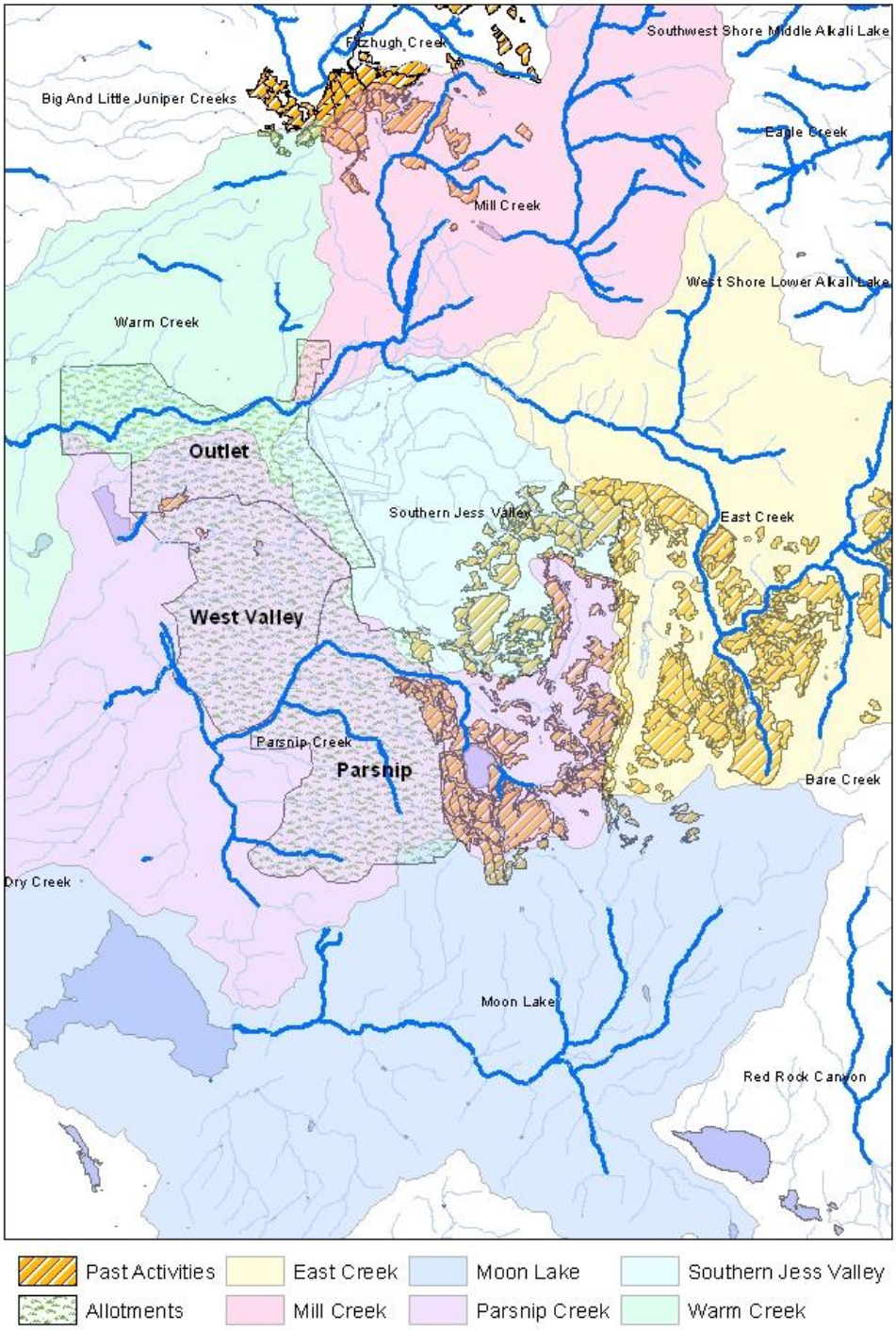


Figure 23: Locations of Allotments and 6th HUC Watersheds.

There is no spatial element to the method, or any way of weighting the effect of features based on location in the watershed. For example, a road that is on the valley bottom versus one on the ridge crown with the same runoff potential might have very much different effect on the condition of a stream channel, but this is not considered by ERODA.

Assessment was conducted on six 6th HUC that include the allotments or contain upper watershed of streams flowing through allotments so that the condition of a given stream's watershed could be analyzed at once. Analysis on smaller watersheds, such as 7th HUC were considered and dismissed because allotment acreage were largely in the Parsnip Creek watershed and past management activities were outside allotment boundaries. Figure 28shows the location of the allotments and watersheds assessed. Table 1 gives the results of the ERODA runs. The information in Table is for all alternatives considered in this project so the table will be referred to in succeeding sections.

TOC %ERA	Watershed	Current %ERA	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
16-18	East Creek	0.9	0.9	0.9	0.9	0.9	
16-18	Mill Creek	0.6	0.8	0.8	0.8	0.8	
16-18	Moon Lake	0.0	0.0	0.0	0.0	0.0	
14-16	Parsnip Crk.	0.7	0.7	0.7	0.7	0.7	
12-14	S. Jess Valley	1.0	1.0	1.0	1.0	1.0	
14-16	Warm Creek	0.8	0.8	0.8	0.8	0.8	

Table 39: %ERA First Year of Implementation Results of CWE Analysis For All Alternatives.

Because of the low values of resultant %ERA only values from the first year of action were presented. In no case did the actions result in a change of the current %ERA of greater than 0.1%. The current condition includes grazing in Mill Creek, Moon Lake, Parsnip Creek and Southern Jess Valley. The program was held at current stocking levels in Alternatives 2 and 4 because the program is not sensitive to such changes and it did not affect results.

The Sage Steppe restoration recommends cutting of juniper occurs almost entirely in Parsnip Creek watershed. In these model scenarios pile burning of debris as a site treatment was assumed, because disposal of slash has yet to be determined and pile burning is the most disturbance technique. Juniper treatment in the riparian areas will be hand cut, drop and leave so no ground disturbance is assumed.

3.8.4.2 Alternative 2

Direct and Indirect Effects

The proposed action involves Sage Steppe Strategy, thinning of juniper on uplands, reduction of grazing impacts in riparian zones about perennial streams, and fencing of a fen on West Valley allotment. This action would also reduce permitted livestock numbers on West Valley allotment. These actions adhere to Best Management Practice (BMP) for range, specifically item 7.3—protection of wetlands and 8.2 and 8.3 which prevents using riparian areas as driveways and install fences (in this case placement of debris barriers) to keep livestock from riparian areas.

Felling juniper that does not exhibit old growth characteristics would occur on 1364 acres of West Valley allotment, in upland areas. Juniper felling would also occur on 88 acres of riparian area along South Fork of the Pit River in the Outlet allotment and 157 acres in the riparian zone of Little Parsnip Creek in the Parsnip allotment. The purpose for the West Valley thinning is restoration of sage lands; and that for the riparian areas is opening up canopy for riparian woody riparian species such as willows and cottonwoods. Both reaches are currently in an early seral stage for vegetation community. Along both reaches, and particularly Little Parsnip Creek the thinning, and leaving of the debris on site, would create barriers to cattle entry. Along Little Parsnip creek, cattle tailing in the riparian zone has altered channel morphology and is described in detail in the section above—Stream Corridor Condition.

Permitted livestock numbers would be reduced in half on the West Valley allotment from 834 animal units to 371, which reflects current usage.

Current conditions of vegetative cover particularly grasses would be expected to continue, or increase where juniper removal would occur on West Valley allotment (see Range report for details), within the Parsnip Creek watershed. No detrimental trend in hydrologic function is expected or increased potential of surface erosion, insofar as the thinning will not lead to decreased levels of ground cover. Currently there is no obvious surface runoff from the uplands, and ground cover meets regional guidelines for effective soil cover for reducing risk to erosion.

The upward trend noted for the unnamed West Valley stream, and Reach 311 of the South Fork Pit River would continue under practices that maintain, or in the case of West Valley significantly reduce livestock numbers. The high upper banks of the West Valley stream may continue to erode back from the channel eventually to angle of repose between 30 and 40 degrees. Water quality would remain the same with perhaps some reduction in sediment load and turbidity in West Valley allotment due to reduced livestock numbers, and in Parsnip and Outlet allotments because of barriers posed by downed and left junipers in riparian areas at risk. It is not entirely clear if the floodplain erosion on Reach 313 on the South Fork Pit River, contained within the Outlet allotment, may be result of one-time stream channel aggradation or livestock trailing, though circumstantial evidence leans toward the former with the record of disturbance in Jess Valley from peat mining. In this case any elevated levels of sediment from the channel will continue and be outside the ability of management to control, until an equilibrium state of average annual peak flow and channel dimensions is reached.

The effect to water quality impairment of pH and salinity on the South Fork Pit River as listed by the state in biennial 303(d) reports would be unknown. The source of the impairment is unknown, although it is speculated here it might be due to irrigation.

Cumulative Effects

Cumulative effects methodology and overall results are discussed in the section above for Alternative 1. Analysis of cumulative effects adheres to range BMP item 7.8, to protect beneficial uses by identifying effects of multiple management activities.

There is no substantive change to watersheds of the 6th code HUC level for any of the alternatives over the current condition. The bulk of the allotment area is within the Parsnip Creek watershed, as well as about 1/3 of past timber harvest going back nearly 40 years. The timber harvest is mostly 15 to 20 years in the past. At 20 years post-harvest the ERODA model returns about ½ recovered. In other words, over ½ of the initial %ERA is subtracted. Total harvest activity acreage is 6% of the total in the Parsnip Creek watershed, and grazing acreage another 36%. Harvest activity acreage for each watershed for the period of the past 30 years is listed in Table .

Watershed	Watershed (Acres)	Past Harvest Activity (Acres)	Grazing (Acres)	% Harvest Acreage of Watershed	% Grazing Acreage of Watershed
East Creek	29,474	3,728	0	12.6	0
Mill Creek	22,299	179	241	0.8	1.1
Moon Lake	46,926	95	176	0.2	0.4
Parsnip Creek	38,616	1,945	13,889	5.0	36.0
S. Jess Valley	12,384	785	1,181	6.3	9.5
Warm Creek	27,784	0	240	0	0.9

Table 40: Management Activity for 6th HUC Watersheds.

3.8.4.3 Alternative 3

Direct and Indirect Effects

Alternative 3 would also include the Sage Steppe Strategy (thinning of juniper), but would retain current permitted numbers of livestock on West Valley allotment.

Current conditions of vegetative cover particularly grasses would be expected to continue, or increase where juniper removal would occur on West Valley allotment (see Range report for details), within the Parsnip Creek watershed. No detrimental trend in hydrologic function is expected or increased potential of surface erosion, insofar as the thinning will not lead to decreased levels of ground cover. Currently there is no obvious surface runoff from the uplands, and ground cover meets regional guidelines for effective soil cover for reducing risk to erosion.

The upward trend noted for the unnamed West Valley stream, and Reach 311 of the South Fork Pit River would continue under practices that maintain current livestock numbers. The high upper banks of the West Valley stream may continue to erode back from the channel eventually to angle of repose between 30 and 40 degrees.

Water quality would remain the same in streams with possible exception of unnamed West Valley channel. There due to possible significant increase in livestock numbers could be an increase in sediment load and turbidity, mostly from riparian area damage.

Reduction in sediment load would be expected in Parsnip and Outlet allotments because of barriers posed by downed and left junipers in riparian areas at risk. However, any elevated levels of sediment from Reach 313 in the Outlet allotment over natural background rates, and due to past aggradation will continue. This effect is outside management to control until an equilibrium state between annual peak flow and channel dimensions is reached.

The effect to water quality impairment of pH and salinity on the South Fork Pit River as listed by the state in biennial 303(d) reports would be unknown. The source of the impairment is unknown, although it is speculated here it might be due to irrigation.

Cumulative Effects

Cumulative effects methodology and overall results are discussed in the section above for Alternative 1. Analysis of cumulative effects adheres to range BMP item 7.8, to protect beneficial uses by identifying effects of multiple management activities.

There is no substantive change to watersheds of the 6th code HUC level for any of the alternatives over the current condition according to the ERODA model. The bulk of the allotment area is within the Parsnip Creek watershed, as well as about 1/3 of past timber harvest going back nearly 40 years. The timber harvest is mostly 15 to 20 years in the past. At 20 years post-harvest the ERODA model returns about ½ recovered. In other words, over ½ of the initial %ERA is subtracted. Total harvest activity acreage is 6% of the total in the Parsnip Creek watershed, and grazing acreage another 36%. Harvest activity acreage for each watershed for the period of the past 30 years is listed in Table .

3.8.4.4 Alternative 4

Direct and Indirect Effects

Alternative 4 would not include Sage Steppe Strategy, but would reduce permitted livestock numbers on West Valley allotment.

Current conditions of vegetative cover particularly grasses would be expected to continue, or increase where juniper removal would occur on West Valley allotment (see Range report for details), within the Parsnip Creek watershed. No detrimental trend in hydrologic function is expected or increased potential of surface erosion, insofar as the thinning will not lead to decreased levels of ground cover. Currently there is no obvious surface runoff from the uplands, and ground cover meets regional guidelines for effective soil cover for reducing risk to erosion.

The upward trend noted for the unnamed West Valley stream, and Reach 311 of the South Fork Pit River would continue under practices that maintain current livestock numbers. The high upper banks of the West Valley stream may continue to erode back from the channel eventually to angle of repose between 30 and 40 degrees.

Water quality would remain the same with perhaps some reduction in sediment load and turbidity in Parsnip and Outlet allotments because of barriers posed by downed and left junipers in riparian areas at risk. Any elevated levels of sediment from the 313 reach on South Fork Pit

River will continue and be may be outside management control until an equilibrium between annual peak flow and channel geometry is reached.

The effect to water quality impairment of pH and salinity on the South Fork Pit River as listed by the state in biennial 303(d) reports would be unknown. The source of the impairment is unknown, although it is speculated here it might be due to irrigation.

Cumulative Effects

Cumulative effects methodology and overall results are discussed in the section above for Alternative 1. Analysis of cumulative effects adheres to range BMP item 7.8, to protect beneficial uses by identifying effects of multiple management activities.

There is no substantive change to watersheds of the 6th code HUC level for any of the alternatives over the current condition. The bulk of the allotment area is within the Parsnip Creek watershed, as well as about 1/3 of past timber harvest going back nearly 40 years. The timber harvest is mostly 15 to 20 years in the past. At 20 years post-harvest the ERODA model returns about ½ recovered. In other words, over ½ of the initial %ERA is subtracted. Total harvest activity acreage is 6% of the total in the Parsnip Creek watershed, and grazing acreage another 36%. Harvest activity acreage for each watershed for the period of the past 30 years is listed in Table .

3.8.5 Addendum

The Hydrology Report for the South Warner Range Project EA was completed on June 25, 2013. Since this report was completed a fifth alternative (Alternative 5) was added to the project analysis. This addendum report documents the additional Hydrological analysis for Alternative 5 and the prescribed Best Management Practices (BMPs) applicable to all alternatives under the South Warner Project.

3.8.4.5 Alternative 5

This Alternative is similar to Alternative 2 and 3 except the maximum permitted numbers would be 506 Head Months after the two years of rest from the juniper treatment. The Head Months for this alternative are based on data from the dominant vegetation layer in GIS for the West Valley Allotment. The vegetation layer provides an average forage production for the various vegetation types. The permittee would be allowed to run full permitted numbers but once season of use or allowable utilization standards are met he will have to come off the allotment. The allowable utilization standards will remain the same as stated in Alternative 2 and 3.

Allotment	Season of Use	Permitted Head Months (HM) & Animal Unit Months (AUMs)	Proposed Head Months (HM) & Animal Unit Months (AUMs)
West Valley	**5/1-6/30**	**632 HM/834 AUMs**	**506 HM/670 AUMs**

Table 41: Proposed Permitted Use, Alternative 5

Indirect/Direct & Cumulative Effects

Hydrologic effects of Alternative 5 would be the same as Alternative 3. All the same actions would occur under this alternative. The only difference between the two alternatives would be a slight reduction in permitted animals in the West Valley Allotment. Alternative 5 would have the same effects but slightly reduced from Alternative 3, because of the slight reduction in numbers. Below is the Hydrologic Analysis for Alternative 3, documented in the original Hydrology Report. Cumulative Effects results from the ERODA model for Alternative 5 would also be the same as Alternative 3.

3.9 Noxious Weeds

3.9.1 Introduction

This section explains the risk of introducing, establishing, or spreading invasive species associated with the proposed action and alternatives.

3.9.2 Scope of Analysis, Methodology, and Indicators

An initial review was conducted using the MDF noxious weed GIS database to identify known noxious weed occurrences within the project area. Afterwards, MDF botany survey technicians and interns surveyed within the South Warner allotments for rare plants and noxious weeds in 2011 and 2013.

3.9.3 Affected Environment

Six California Department of Food and Agriculture (CDFA)-listed noxious weeds (CDFA 2010) are known to occur within the South Warner Grazing analysis area: the class A noxious weeds *Centaurea diffusa* (diffuse knapweed), *C. stoebe* (spotted knapweed), and *Onopordum acanthium* (Scotch thistle); the class B noxious weed *Salvia aethiopis* (Mediterranean sage); and the class C noxious weeds, *Centaurea solstitialis* (yellow star-thistle), *Elymus caput-medusae* (Medusahead rye), and *Hypericum perforatum* (Klamathweed). Medusahead and Mediterranean sage are particularly common in the area; scattered infestations of Scotch and Canada thistles also occur. The following table shows details about the noxious weeds known to occur on the three allotments.

Table 42. Noxious weed sites within project area.

MDF Occ. №	Weed Species	Last Year Documented	Location	Est. Pop. or Ac.
CEDI391409C	diffuse knapweed	2013	Co. Rd. 64, ½ mi W of Cold Spr.	0.1 ac; 1,200 indiv.
CEMA391409C	spotted knapweed	2011	Co. Rd. 64, ½ mi W of Cold Spr.	not found in 2011
CESO391407H	yellow star-thistle	2006	Co. Rd. 64, ⅓ mi E of W Valley Cr.	< 0.1 ac; 50 indiv.
CESO391409H	yellow star-thistle	2011	Co. Rd. 64, ¾ mi W of Cold Spr.	not found in 2011
CIAR381401E	Canada thistle	2011	just SE of last bend in rd. 39N34	0.2 ac.
CIAR381517L	Canada thistle	2011	¾ mi SE of Blue Lake Ranch	< 0.1 ac.
CIAR391421J	Canada thistle	2011	1 mi W of W Valley Spr.	0.1 ac. in 2 subpops.
CIAR391422J	Canada thistle	2013	< 0.1 mi W of W Valley Spr. along creek	< 0.1 ac; 150 stems
HYPE391409C	Klamathweed	2011	along Co. Rd. 64, ¾ to 1 mi W of Cold	< 0.1 ac in 5

MDF Occ. №	Weed Species	Last Year Documented	Location	Est. Pop. or Ac.
			Spr.	subpops.
ONAC391409C	Scotch thistle	2012	along Co. Rd. 64, ½ to ¾ mi W of Cold Spr.	0.2 ac. in 3 subpops.
ONAC391421J	Scotch thistle	2011	1 mi W of W Valley Spr.	~3 ac. in 3 subpops.
ONAC391422J	Scotch thistle	2013	0.1 mi ENE of W Valley Spr.	1.4 ac. in 2 subpops.
ONAC391432X	Scotch thistle	-	Along Cedar Ck, ½ to 1½ mi S of W Valley Res.	~10 ac.
SAAE391402L	Mediterranean sage	2011	Co. Rd. 64, ¼ to ½ mi. N of fork in rd at Jess V.	1.6 ac.
SAAE391417O	Mediterranean sage	2013	along rd. 39N19 ~2 mi. S of Co. Rd. 64	< 0.1 ac; 20 indiv.
SAAE391409D	Mediterranean sage	2013	Co. Rd. 64, ½ mi. W of Cold Spr.	~0.1 ac; 25 indiv.
SAAE391410D	Mediterranean sage	2011	Co. Rd. 64, ¼ mi. E of fork in rd.	< 0.1 ac.
SAAE391416C	Mediterranean sage	2011	Outlet Allotment	< 0.1 ac.
SAAE391421J	Mediterranean sage	2011	1 mi W of W Valley Spr.	~7½ ac.; 375 indiv.
SAAE391433X	Mediterranean sage	2011	1 mi SW of S end of W Valley Res.	~1¾ ac.; 40 indiv.
TACA8	Medusahead	-	Throughout West Valley, Outlet allots.	~3,000 ac.

Disturbances to the soils and native plant communities within the project area increase the habitat vulnerability to noxious weeds (Sheley *et al.* 1999), and the presence of non-native, invasive plant species indicates disruption of the native plant community (Eviner *et al*. 2010; Hierro *et al.* 2006) and a consequent inability to prevent further invasion by other nonnative weeds. For instance, the presence of Med sage in the Medusahead-invaded interior of the Outlet allotment, far from the usual dispersal corridors or frequently disturbed sites in which it is more commonly found in the rest of the forest, indicates the ease with which landscapes that have been heavily altered by nonnative invasive plants are susceptible to invasion by listed noxious weeds.

Anthropogenic vectors in the area can be related to noxious weed treatment, fire suppression, firewood gathering, mining, recreation (incl. OHV use and dispersed camping), ditch maintenance, power line maintenance, and road maintenance. Vehicles can introduce weed seeds from more or less distant places.

3.9.4 Environmental Consequences

3.9.4.1 Alternative 1
Direct/Indirect Effects

Livestock grazing would cease two years after the decision to select Alternative 1. Some ungrazed broadleaf weed sites, freed from grazing pressure, might be able to increase in density and size; for instance, increased vigor in Canada thistle has been noted in the Likely and Clear Lake areas following the removal of cattle grazing. On the other hand, reduced disturbance might also promote growth amongst the native plant community, and increase ecosystem resilience to weed invasion. The cessation of grazing management would also reduce potential weed vectors.

Under alternative 1, juniper treatments would not take place, as they would under all other alternatives (particularly 2, 3, and 5, which include 1,388 acres of juniper treatment in West Valley allotment). Understories of dense juniper woodlands tend to be too shady for many other common native species to thrive (Miller *et al*. 2005). This leads to a decrease in native seedbanking throughout the juniper woodland. When the dense woodland burns, instead of native species returning afterward, the burnt area tends to be colonized by nonnative grasses such as cheatgrass and Medusahead, which are already present in the woodland understory, and which tend to perpetuate themselves to the exclusion of native species (D'Antonio & Vitousek 1992). Therefore, compared with Alternatives 2, 3, and 5, Alt. 1 presents a higher risk of widespread nonnative annual grass spread and densification where juniper woodlands presently dominate.

Habitat alteration as a result of selecting Alternative 1 would be quite low, except in juniper woodlands, where it could become high if untreated juniper woodlands continue to suppress native understories until they burn. Thus, overall habitat alteration is considered moderate. The elimination of grazing management, including range improvement maintenance, and the absence of any traffic for juniper cutting, would present the lowest vector risk of any alternative.

3.9.4.2 Alternative 2
Direct/Indirect Effects

Implementation of any action alternative includes the potential for soil disturbance and its generally unfavorable consequences, altering plant community composition, and introducing (by various means) plant materials from other places, or distributing them around the allotment, potentially including noxious weed seeds (Karalius & Alpert 2010).

Any machinery or vehicles on the Modoc NF are potential weed vectors; due to proposed juniper treatments for this project, there would be an increased amount of traffic in the area venturing off the established roads. Noxious weed seeds can become attached to these vectors and then dispersed and spread into areas that are not currently infested. Cheatgrass seeds, for instance, as well as travelling in mud on shoes or tires, can also stick to clothing, shoelaces, and crannies on the surface of vehicles as a means of dispersal.

Livestock grazing provides a vector for non-native plant species, including noxious weeds. Livestock grazing disturbance can increase site vulnerability to invasive plants, while the animals themselves can serve as vectors for invasive plant propagules. Invasive plants can reduce habitat quality and quantity through competition with native species, introduction of

allelopathic chemicals into the soil, and/or alteration of soil microbial communities. Invasive annual grasses, particularly Medusahead (*Elymus caput-medusae*) and cheatgrass (*Bromus tectorum*), can alter fire regimes and thereby promote monocultures of themselves. There is currently no effective and economically feasible method for treating annual invasive grasses on the scale at which they currently occur on the three allotments.

Juniper treatments, in contrast to Alternative 1, may reduce the potential for weeds (particularly grasses) to dominate following fire in the area, by allowing more light into the understory, promoting the growth of native species and native seedbanking, and reducing fire intensity and thus soil disturbance (Bates *et al.* 2005). Burning piles, however, does tend to promote noxious weed growth by producing small, very high-intensity spots of fire across the landscape which is readily colonized by nearby invasive species (Scherer *et al.* 2000).

Given the balance of risks and risk reductions, the habitat alteration risk is considered moderate. The risk of increased vectors from project implementation is considered moderate.

3.9.4.3 Alternative 3
Direct/Indirect Effects

Compared to Alt. 2, the larger allowance of grazing animals would increase the number of potential vectors but particularly the risk of disturbance. When compared to a one-time disturbance such as juniper treatments, a sustained increase in grazing levels would affect the allotments annually. For this reason, the increased levels of grazing would raise the risk of habitat alteration.

3.9.4.4 Alternative 4
Direct/Indirect Effects

The noxious weed risk for Alternative 4 is the same as that for Alternative 2, as far as livestock and grazing management are concerned. Vectors would present moderate risks, and habitats would be at a moderate risk of alteration.

Risks would be the same as that for Alternative 1, as far as juniper treatments are concerned: lower risks due to vectors than any other action alternative, but moderate risks due to continued juniper woodland growth and fuels concerns.

In summary, alternative 4 presents the lowest vector risk of any action alternative (though still considered moderate compared to Alt. 1) and a moderate habitat alteration risk.

3.9.5.5 Alternative 5
Direct/Indirect Effects

Noxious weed risks due to juniper treatments would be the same as those for Alts. 2 and 3: vector and habitat alterations would be moderate. Like Alt. 3, increased levels of grazing would increase the risk of habitat alteration. Therefore, overall, vector risk would be moderate, and habitat alteration risk would be high, although not quite as high as for Alt. 3.

3.10 Recreation

3.10.1 Introduction

This analysis reviews the recreational opportunities of the lands managed by the Warner Mountain Ranger District and examines the specifics of recreation in relation to three grazing allotments. It investigates how they may be affected by activity per Forest Plan Standards and Guidelines.

The analysis area of the allotments combined is 17,104 acres. The area includes Outlet, Parsnip, and West Valley allotments. All of which are located in the southwestern corner of the Warner Mountain Ranger District.

The project area is located in the following area of Modoc and Lassen Counties in California: T38N, R14E sections 1-5, 10-16, 22 and 23; T38N, R15E sections 17, 20, 29, 32; T39N, R14E sections 2-3, 5-11, 14-17, 20-29, 32-36 and T39N, R15E section 32.

3.10.2 Scope of Analysis, Methodology, and Indicators

Overview of project proposals

- Renew grazing permits.
- Reduce grazing on West Valley Allotment and continue current grazing practices on Outlet and Parsnip allotments.
- Remove western juniper trees, which lack old growth characteristics, from 1,364 acres and fell juniper trees lacking in old growth characteristics and use them as barriers along 272 acres of stream banks to discourage cattle from trailing along stream banks.
- Install a fence around a fen located at T.39N, R14E, Sec. 20 to protect proper hydrological function.
- Apply adaptive management strategies to improve function of the allotments.

3.10.3 Affected Environment

Affected Environment

The project area falls within the South Warner Mountain landscape of the Modoc National Forest. The overall setting consists of Western Juniper woodland, some Ponderosa Pine stands and riparian areas associated with the South Fork of the Pit River and Parsnip Creek.

Existing Condition

The South Warner Range Analysis project is located in the Warner Mountain Ranger District which is managed primarily for livestock grazing, dispersed recreation and less than 20% timber production.

According to the forest plan three landscape settings from the Recreation Opportunity Spectrum (ROS) are represented. Outlet allotment is characterized as roaded natural, West Valley allotment as roaded natural and semi-primitive non-motorized and Parsnip allotment as semi-primitive non-motorized. This characterization is based upon livestock grazing, past fire

activity, and timber management. Access for hunting, firewood cutting, and dispersed camping are available from the existing road network.

Activities

Firewood cutting, hunting, fishing, ATV riding and dispersed camping are popular uses of the project area by the public. Access to opportunities is provided along Forest roads open to vehicles in the spring, summer and fall. Roads are not maintained in winter. Aside from regular vehicular traffic these roads provide opportunities for those who prefer to hike, mountain bike, ride horseback, or use ATV's. Table 1 under Desired Conditions describes the designation of recreation classes and activities typical of them on the Forest.

Inventoried Roadless Areas

Introduction

One inventoried roadless area (IRA) is within the project boundary. West Valley Allotment contains 2,941 acres and Parsnip Allotment contains 5,280 acres of the Parsnip (05162) IRA. This IRA is included in all five of the proposed actions. Primary uses of the Parsnip IRA include hunting and cattle grazing. Non-conforming uses include livestock ponds, trails, fences, a water diversion ditch not currently in use, and four miles of primitive roads.

This analysis focused on the potential effects of project activities on wilderness characteristics as defined in the Forest Service Handbook (FSH) 1090.12 (72.1).

Wilderness characteristics, as defined at FSH 1090.12 (72.1) and evaluated here include the following:

1. Natural – The extent to which long-term ecological processes are intact and operating.

2. Undeveloped – The degree to which the impacts documented in natural integrity are apparent to most visitors.

3. Outstanding opportunities for solitude or primitive unconfined recreation – Solitude is a personal, subjective value defined as the isolation from sights, sounds, and presence of others and from developments and evidence of humans. Primitive recreation is characterized by meeting nature on its own terms, without comfort and convenience of facilities.

4. Special features and values – Unique ecological, geographical, scenic, and historical features of an area.

5. Manageability – The ability to manage an area for wilderness consideration and maintain wilderness attributes.

Background

Roadless areas are evaluated during the preparation or revision of Forest Plans largely for the purpose of identifying agency recommendations for wilderness to Congress and to assess the potential effects of the various program alternatives being explored during the revision. Only Congress can designate wilderness. The roadless area mentioned above was evaluated during preparation of the 1991 Modoc National Forest Land and Resource Management Plan. The Forest Plan evaluation has no bearing on regulatory protections that may or may not apply under the 2001 Roadless Area Conservation Rule.

Roads and Streams

The main roads of concern (high use and visibility for the popular uses of the area) is Forest Road 64, which runs west to east through the Outlet allotment and Forest Road 39N19 which runs southeast traversing all three allotments.

Rivers and Streams of significance (because of their popularity for fishing and accessibility from the exiting road network) include:

- South Fork Pit River (running through the north edge of the Outlet allotment).
- Parsnip Creek (running between the West Valley and Parsnip allotments and through the northern portion of the Parsnip allotment).

These water ways listed are not considered to be wild or scenic.

Desired Condition

The 1991 Modoc National Forest Land and Resource Management Plan (the Forest Plan) and the 2004 Sierra Nevada Forest Plan Amendment: Final Supplemental Environmental Impact Statement (the Sierra Nevada Framework) offers forest wide goals, objectives, guidelines and standards for recreation resources, visual resources and OHV travel, and sets the vision or standards for the desired condition.

Resource Goals and Objectives

The Forest uses the agencies Recreation Opportunity (ROS) concepts and definitions to establish its own allocations for recreation use. There are three adopted allocations, based on the ROS for the project area.

Table 43. Forest Plan Recreation Allocation – ROS Description

Forest Plan Allocation	Equivalent ROS Class	Description
Summer Roaded (Road-based)	Roaded Natural	Rural Offers wide variety of opportunities for varied types of travel and recreational activities.
Summer Motorized Backcountry	Semi-primitive Motorized	Offers opportunities for varied types of travel and recreational activities.

Recommended Wilderness.	Semi-primitive Non-motorized	**Offers opportunities for foot, stock, ski, snowshoe travel, dispersed camping, and other activities.**

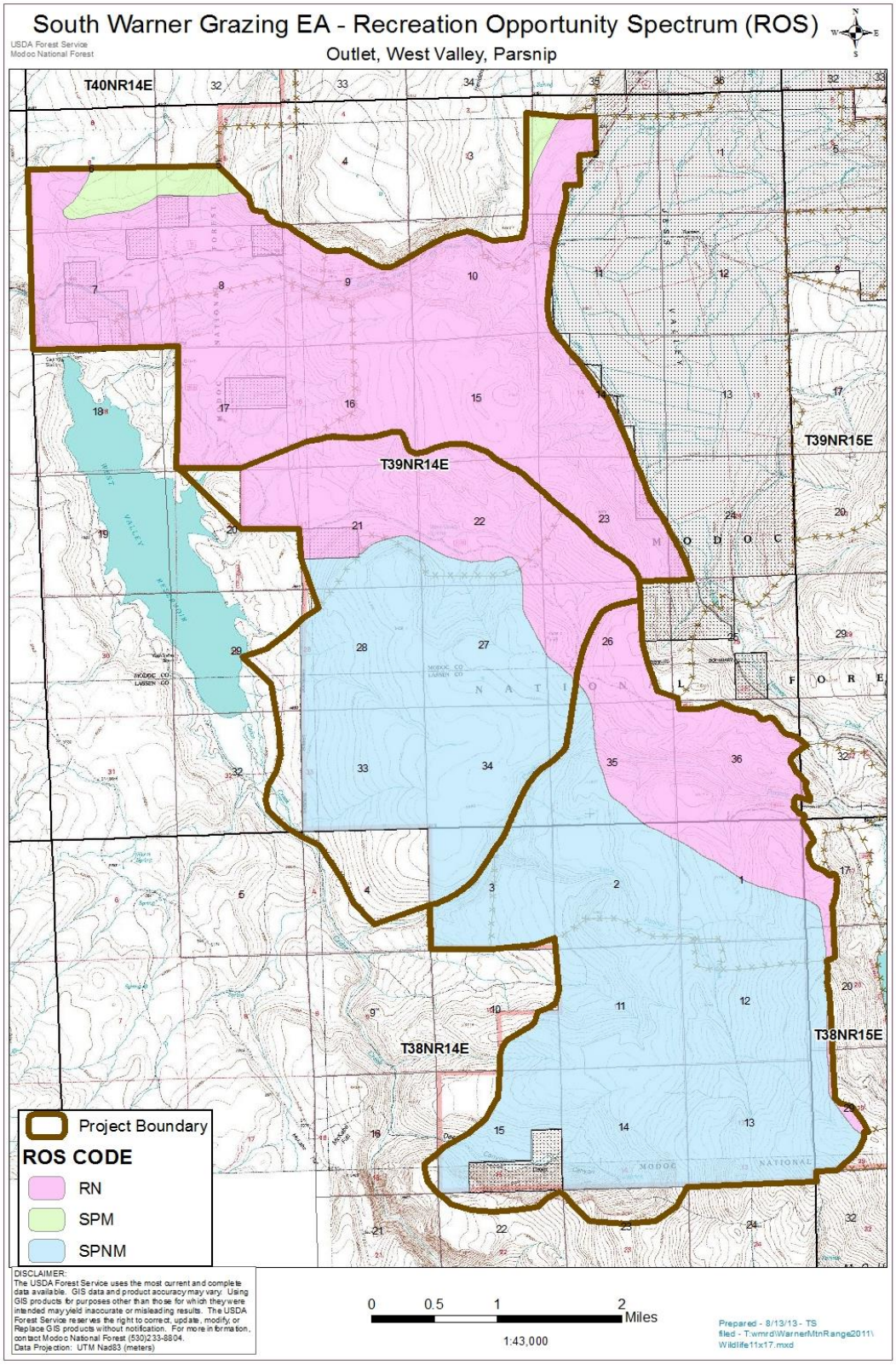


Figure 24. Recreation allocations based upon the Forest's current GIS information.

Guidelines
Guidelines from the forest plan give a strict or specific set of expectations to ensure properly managed resources.

Recreation

The recreation guidelines relating most directly to this project are found on page 4-20 of the Forest Plan and include:
Guideline: Design resource management activities to complement the Recreation Opportunity Spectrum (ROS) classes delineated on the ROS map and referred to in each prescription.

Guideline: Roaded Natural

- Provide opportunities for such recreation activities as pleasure driving, water-skiing, hunting, and camping in areas characterized by predominantly natural-appearing environments with moderate evidence of human activities.

Guideline: Semi-Primitive Motorized

- Provide opportunities for such recreation activities as off-highway vehicle touring, hunting, and camping in areas characterized by predominantly natural or natural appearing environments with low concentration of users.

Guideline: Semi-Primitive Non-Motorized

- Provide opportunities for such recreation activities as hiking, fishing and tent camping in predominantly natural environments with low incidence of interactions between users.
- Prohibit motorized recreation; eliminate and prevent OHV use.

Visual Resources

Table 44. Forest Plan - Visual Quality Objectives

Forest Plan Allocation - Visual Quality Objective	Description
Modification	Management activities may dominate the original landscape.
Partial Retention	Management activities remain visually subordinate to the characteristic landscape.
Retention	Management activities result in a natural appearing landscape. Activities may occur but are not visually evident to the casual observer.

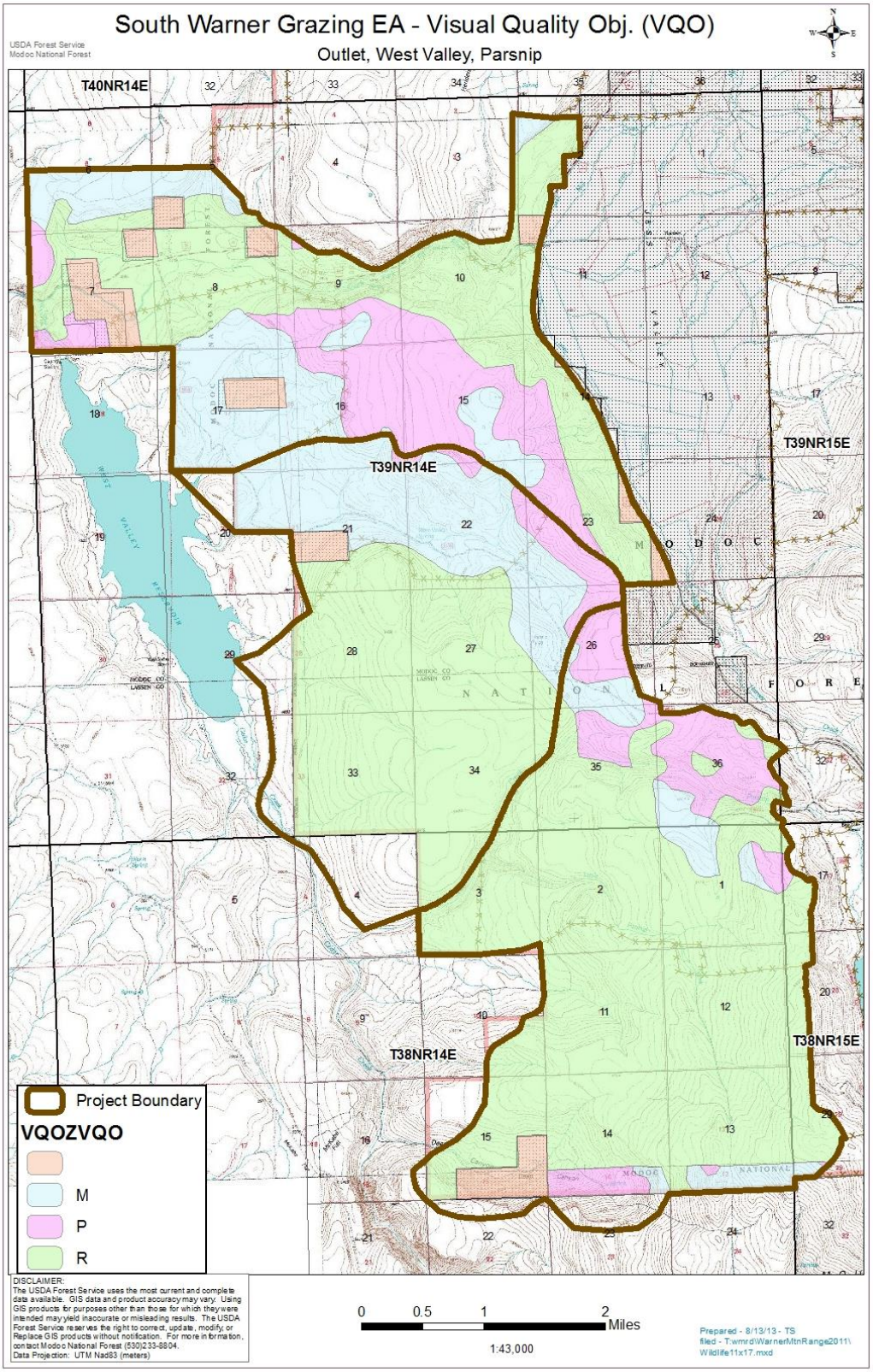


Figure 25. Visual Quality Objectives based upon the Forest's current GIS information.

Guidelines relating most directly to this project in regards to visual resources are found on pages 4-24/25 of the Forest Plan, and include:

Guideline: Visual Quality Objectives

- Manage visual resources to prevent unacceptable alteration of landscapes by designing and implementing management activities to meet or exceed adopted Visual Quality Objectives (VQOs).
- Capitalize on opportunities to achieve rehabilitation of unacceptable modification conditions during management activities with other resources.

3.10.4 Environmental Consequences

Methodology

The effects analysis provided below is based on three elements:

- How closely the project meets the expectations of the recreation allocation listed in table 1. That is, does it meet or fail to meet allocations and guidelines?
- Whether or not guidelines for recreation, visual resources as outlined in the forest plan were followed.
- How closely the project allows the wilderness characteristics that currently exist to remain for the Parsnip (05162) inventoried roadless area.

Incomplete and Unavailable Information

The Forest Plan did not mention in its Goals, Objectives, or Guidelines an acre or other measure for managing the recreation allocations. This is unavailable information.

3.10.4.1 Alternative 1

Direct and Indirect Effects

Activities
Sport hunting for deer and elk as well as bird and small game is common in the project area. In the short term, no effect to this activity is expected under the no grazing alternative. Use of the road system, and the recreational opportunities attributed to them (to include firewood cutting, fishing, ATV riding and dispersed camping) will not be affected either. In the long term, increased forage and cover will be available for wildlife, benefitting sport hunting.

Inventoried Roadless Areas
Under Alternative 1, no grazing is proposed, so there is no potential to impact the roadless area's wilderness characteristics or attributes from how it currently exists.

Roads and Streams
Under Alternative 1, no grazing is proposed. In the short term and long term, livestock drives and congregations would be reduced, benefitting those traveling on forest roads. Additionally,

impacts to riparian areas will lessen, those seeking fishing, camping and other forms of dispersed recreation will benefit.

Design Features and Mitigation Measures
No design features or mitigation measures are needed or recommended under Alternative 1.

Cumulative Effects
Appendix A includes the past, present, and foreseeable future actions within the allotment boundaries. Past actions are no longer affecting recreation opportunities or activities. The type of projects that could impact recreation is road maintenance.

Road maintenance projects benefit most recreation users by ensuring that safe access to various parts if the forest will continue or be improved. No new road construction projects are reasonably foreseeable, so there are no cumulative effects to roadless areas.

No grazing is proposed in this alternative, so therefore, this alternative would not contribute to the past, ongoing, or future affects to recreation or roadless characteristics from activities listed in Appendix A. All types of recreation will continue in the allotments, including, but not limited to, firewood cutting, hunting, fishing, ATV riding and dispersed camping. No adverse direct or indirect effects on recreation ROS allocations or VQOs is anticipated, adverse cumulative effects are not likely to occur as a result of the no grazing Alternative.

3.10.4.2 Alternative 2

Direct and Indirect Effects
The proposed activities include grazing re-authorization and updating allotment management plans, structural and non-structural improvements, and adaptive management strategies.

Activities
Direct effects of the proposed action include impacts to sport hunting where wildlife would be competing with livestock for forage and cover. Existing opportunities for those pursuing other types of dispersed recreation would continue.

Inventoried Roadless Areas

Under Alternative 2, improvements to all allotments are proposed. In the short term felling and burning piles of juniper in the West Valley Allotment would affect the roadless area's wilderness characteristics or attributes of "Natural" and "Undeveloped", that is, piles and burning would be apparent to most visitors. Felling western juniper trees, lacking in old growth characteristics, along 184 acres of Little Parsnip Creek to provide barriers against livestock trailing would also affect the aforementioned roadless area's wilderness characteristics or attributes. Both improvements to these allotments would be a benefit in the long term. Reducing western juniper in parts of the West Valley Allotment would restore the appearance that long-term ecological processes are intact. Similarly, in the Parsnip Allotment "Natural" and "Undeveloped" attributes would be restored along Little Parsnip Creek.

Roads and Streams
Under Alternative 2, re-authorization of grazing permits is proposed with a reduction in West Valley Allotment permitted numbers. In the short term and long term, livestock drives and

congregations would remain, impacting those traveling on forest roads. Additionally, those seeking fishing, camping and other forms of dispersed recreation near riparian areas will be subject to the sight and sound of livestock trailing and congregation. Felling western juniper along the South Fork of the Pit River within the Outlet Allotment will benefit those seeking camping and other forms of dispersed recreation near riparian areas in the long-term.

Design Features and Mitigation Measures
No design features or mitigation measures are needed or recommended under Alternative 2.

Cumulative Effects
Appendix A includes the past, present, and reasonably foreseeable future actions within the allotment boundaries. Few past actions affect recreation opportunities or activities. The type of projects that could impact recreation is proposed grazing re-authorization, structural and non-structural range improvements, and road maintenance. Adaptive Management Strategies derived from monitoring data may have direct and indirect effects on recreation. These management actions can only be analyzed once they are developed.

Grazing re-authorization and range improvements would both benefit and detract from some recreationists' experiences. Impacts to sport hunting relate to decreased forage and cover for wildlife. Other types of dispersed recreation would continue and be relatively unaffected.

The Parsnip IRA received management activity in the past that attributes to the current condition today (i.e. it is largely defined as an area where past management activity has not occurred, particularly road construction, although some past development is included). Improvements proposed in the Parsnip IRA (05162) of western juniper reduction through hand felling and pile burning in the West Valley Allotment and felling of juniper along Little Parsnip Creek as livestock barriers in the Parsnip Allotment is expected to overall improve the roadless area's attributes of "Natural" and "Undeveloped". However, these direct long-term effects are localized to a small portion of the both West Valley and Parsnip Allotments.

Road maintenance projects benefit most recreation users by ensuring that safe access to various parts of the forest will continue or be improved. No new road construction projects are reasonably foreseeable. Those traveling on forest roads during season of use may encounter livestock drives and congregations. These encounters can both detract from and benefit a recreationists' experience. Safe access can be compromised with an abundance of livestock present. Conversely, some recreationists' prefer pastoral settings and the tangible presence of a working landscape. Long-term direct benefits are expected for dispersed recreation in riparian areas (especially to those camping and fishing) where felling of western juniper is proposed to create barriers to livestock trailing along streambanks.

With the implementation of the proposed action all types of recreation would continue in the allotments with limited affects. Direct affects associated with range improvements are not expected to appreciably add to past effects or detract from ROS allocations or VQOs.

3.10.4.3 Alternative 3

Direct and Indirect Effects
The effects of this alternative are similar to Alternative 2.

Cumulative Effects
The effects of livestock grazing and range improvements would be similar to those discussed in Alternative 2. Those recreationists' participating in sport hunting would benefit from improved habitat for deer, elk, bird and small game.

3.10.4.4 Alternative 4

Direct and Indirect Effects
The effects of livestock grazing and range improvements would be similar to those discussed in Alternative 2. The effects of livestock grazing and range improvements would be similar to those discussed in Alternative 2. However, there would be no enhancement of sage-steppe to benefit sport hunting.

Cumulative Effects
The cumulative effects associated with this alternative would be the same as those discussed under Alternative 2.

3.10.5.5 Alternative 5

Direct and Indirect Effects
The effects of livestock grazing and range improvements would be similar to those discussed in Alternative 2. Those recreationists' participating in sport hunting would benefit from improved habitat for deer, elk, bird and small game.

Cumulative Effects
The cumulative effects associated with this alternative would be the same as those discussed under Alternative 2.

3.11 Silviculture

3.11.1 Introduction

This report focuses on the conifer and associated overstory tree vegetation within the designated project area. The primary objectives of this report include describing the existing and desired conditions, and addressing the direct, indirect and cumulative effects of the proposed alternatives.

3.11.2 Scope of Analysis, Methodology, and indicators

Analysis Area

This analysis area is approximately 17,970 acres in size and lies within the southernmost portion of the Warner Mountains at an elevation range of approximately 4,600 to 7,200 feet. The area lies within three existing grazing allotments (Outlet Cattle and Horse (C&H), West Valley C&H, and Parsnip C&H) that are geographically similar and in close proximity to each other. All three allotments are located in Modoc and Lassen Counties approximately 10 miles east of Likely, California. The analysis in this report will focus entirely on the juniper treatment areas of the

project which are located in portions of all three allotments (see map 1 in Appendix A). For the purposes of this report the four designated treatment areas will be referred to as the West Valley Treatment Area, Parsnip Riparian Treatment Area, Outlet Riparian Treatment Area and the West Valley Riparian Treatment Area. The total juniper treatment acreage is 1646 acres. See Proposed Action and Environmental Consequences below for details on treatments.

Methodology of Analysis

Information Sources

Random Stratified Fixed Area Tree Measurement Plots (December 2013):

In order to assist in quantifying the stocking levels, stand structure and old growth component across the West Valley treatment area random stratified plots were installed. Thirty eight plots were installed across the West Valley Treatment area. Prior treatment areas were excluded from the plot distribution. The plots were 1/50 of an acre in size and randomly distributed across the designated treatment area using a stratified method (random grid system) generated through the use of Geographic Information System (GIS). The random distribution within the treatment area was generated through the use of ArcCatilog10 Create Random Points tool. Digitized way points for each plot location were then generated and uploaded onto Garmin GPS devices and used to locate the plots on the ground. Plot information collected included tree species, diameter at breast height (dbh), aspect, slope, understory ground cover and old growth characteristics. Trees were counted as old growth when they fell within the measure plot and exhibited the old growth characteristics listed above.

GIS Data

The GIS Cal-Veg layer was utilized in order to provide an estimation of juniper dominated acreage across the treatment areas and within the associated 6th field Hydrologic Unit Code (HUC). In addition, GIS digitization tools were used to estimate acreages of past juniper treatments within the project area and associated HUCs.

Analysis

Field data collected was entered into a Microsoft Office Excel spreadsheet in order to calculate stand parameters including species composition, trees per acre (TPA), average dbh, presence and condition of understory species as well as the diameter distribution of the stand. This data in conjunction with field reconnaissance and professional knowledge of the stand was used to develop the existing condition and predict future effects of treatment and no treatment alternatives.

Old Growth Definition used for Data Analysis

As per the 2008 Sage Steppe Ecosystem Restoration Strategy (SSERS) old growth trees are defined as trees that were present at or before the mid-1800s (before European settlement). The old growth characteristics are defined as follows:

- Rounded top or unsymmetrical tops that may be sparse and contain limbs
- Deeply furrowed, fibrous bark on the trunk that is reddish in color
- Branches near the base of the tree that may be very large and covered with fruitcose lichens
- Limited terminal leader growth on branches in the upper 25 percent of the canopy

3.11.3 Affected Environment

History and Range Expansion of Western Juniper

Western juniper has continued to expand its geographic range over the past 130 years at an unprecedented rate. Pre-settlement western juniper stands (outside of Mazama Ecological Province) are estimated to account for less than 10 percent of today's juniper woodlands (Miller et al 2005). This expansion is believed to be a result of a combination of factors including the reduced role of fire within the ecosystem, livestock grazing methods and wetter climate conditions in the late 1800s to early 1900s (Miller et al 1999).

Intensive livestock grazing in the late 1800s to the 1930s reduced the amount of fine fuels available to carry frequent fires through the sage steppe ecosystems. This coupled with the effects of post-World War II fire suppression tactics had a major role in altering the fire regime of these ecosystems. Western juniper has a natural ability to adapt to changes in climate and continue to increase in range and densities. However, under a natural fire regime young junipers would be killed by fire. A pre-settlement fire regime would maintain a more natural distribution of the species by restricting expansion to those areas that have a low capacity to carry fire. (SSERS-FEIS 2008)

"Scientific literature, relict juniper woodlands, tree ring data, down and dead trees and stumps, and historic surveys support the view of the pre-settlement distribution of Western juniper stands as being generally confined to rocky ridges, and sites where fine fuels were too low to carry fire. However, individual large juniper trees were scattered throughout the sage steppe ecosystem" (SSERS-FEIS 2008).

The density and range of western juniper has also increased dramatically within the analysis area of the SSERS FEIS 2008 (includes treatment area of this project). See figures 25 & 26 below. This density increase is documented in several scientific studies including Miller and Wigand 1994, Knapp *et al.* 2001, Miller and Tausch 2001 and Miller *et al.* 2008 (SSERS-FEIS 2008). This range and density increase is also evident within the designated treatment areas and mimics the pattern that has been observed within the interior northwest.

Figure 26. North Fork of the Pit River and Eastern Devil's Garden Rim on the XL Ranch in 1906

Figure 27. North Fork of the Pit River and Eastern Devil's Garden Rim on the XL Ranch in 2007

Figure 26 above captures the North Fork of the Pit River and the eastern Devil's Garden Rim on the XL Ranch in 1906. This location is approximately six miles north of Alturas, CA along the west side of Highway 395. The photo exhibits the lack of western juniper in 1906 along the eastern facing slope of the Devil's Garden Rim in the background.

Figure 27 captures the same area in 2007. The dramatic increase in western juniper along the eastern facing slope of the Rim is apparent in the photograph. The dramatic increase in range and density captured in these two photographs mimics the juniper expansion that has occurred

throughout the treatment areas of this project as well as across the sagebrush and grass lands of the forest.

Current Range of Western Juniper

"Western juniper currently occupies 9 million acres in central and eastern Oregon, northeastern California, southwestern Idaho, and northwestern Nevada, and occurs in a few outlying stands in southern Washington" (Miller et al 2005). This is a well-adapted species that has the ability to grow and reproduce in a wide variety of soil types, elevations and climatic conditions. The species variety of western juniper present within the project area (*Juniperus occidentalis* var. *occidentalis Hook)* has the ability to grow in soil textures ranging from clay to sandy with soil temperatures ranging from mesic to frigid. The majority of the western juniper zone receives between 10 and 15 inches of precipitation per year, but the species can exist in areas receiving as little as 7 inches and as much as 20 inches annually. The majority of habitat for this species variety occurs between 2,000 and 6,000 feet elevation, however it also occurs at elevations of 600 to 8000 feet. (Miller et al 2005)

West Valley Treatment Area

The West Valley Treatment Area is approximately 1364 acres in size. The topography of this area is defined by a small drainage formed by an unnamed perennial stream that flows to the west along the bottom of the treatment area. The terrain slopes gradually uphill on the north and south sides of the riparian area associated with the stream. Slopes range from 3 to 30 percent across the majority of ground with occasional slopes of up to 45% along the upper edges of the drainage. The resulting topography is composed of a mix of gradual slopes and minor draws leading down the drainage mixed with rocky ridges and rock outcroppings containing shallow, marginal soils. The majority of the area is composed of a harsh, dry growing environment with occasional moist micro sites including two identified springs and a fen along the bottom of the drainage near the perennial stream. The conifer vegetation within this area is composed primarily of western juniper with scattered occurrences of individual ponderosa pine. The understory consists primarily of sage brush, a mix of native and introduced grasses and areas of rock and bare soil.

Western juniper has continued to expand its range and dominance in this area as evident by comparison to historical photos and the large component of younger western juniper (non-old growth) throughout the treatment area. The chart below exhibits the diameter distribution as well as old growth occurrence within the treatment area.

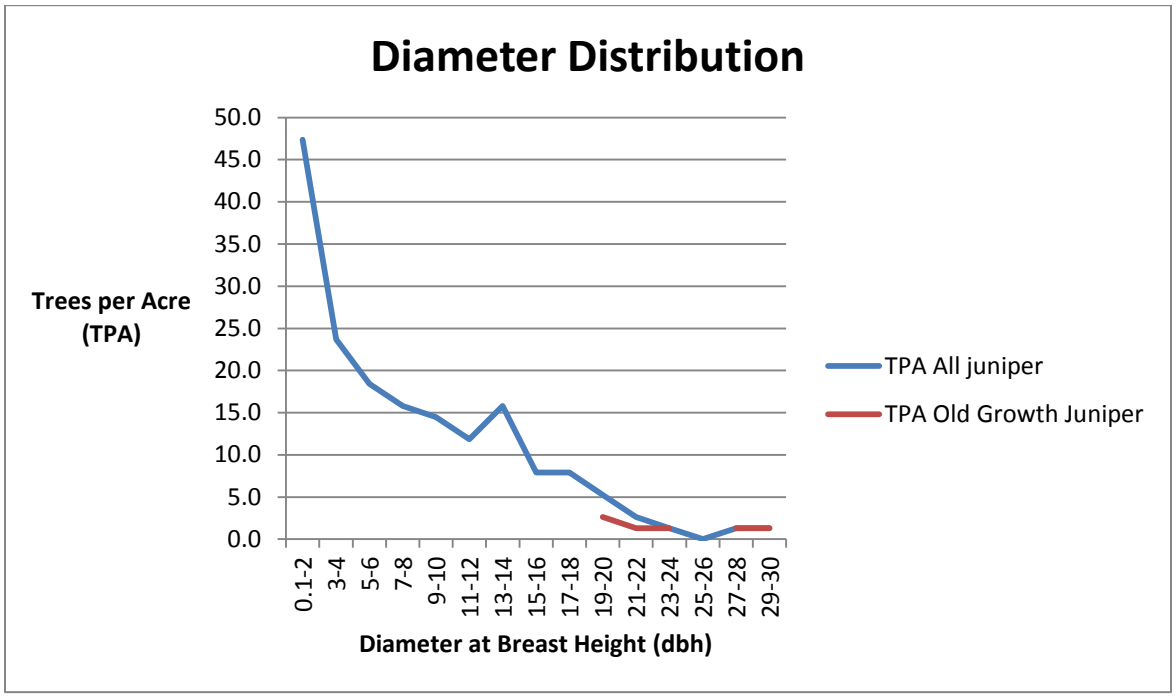


Figure 28

Figure 28 above displays the large component of smaller diameter juniper within the treatment area. The occurrence of old growth juniper that was captured within the measurement plots are all within the larger diameter ranges of 19 inches dbh and greater. Due to the natural distribution of old juniper along rocky ridges, isolated draws, and dryer, harsh growing sites they are typically found in clumps rather than evenly distributed across the landscape. Therefore, random plots across the entire treatment area may not completely represent the number of old growth trees present. However, this data does capture the overall trend in size class with respect to the older trees as well as the percentage of old trees present relevant to the number of younger trees across the treatment acreage as a whole. This data is not an absolute representation of the stand on a tree by tree basis; it captures the overall diameter distribution, stocking level and old growth occurrence of the area.

Stand Summary Table (Table 45)					
Total TPA	Average DBH (inches)	Percentage of Old growth	Average Old Growth DBH	Old Growth max DBH	Old Growth TPA
175.00	6.2	6.0%	20.1	28.6	10.5

Table 45 above displays the stand summary data derived from the random measurement plots. Average trees per acre across the treatment area is 175 with an average dbh of 6.2 inches. Old growth trees represent 6 percent of the total trees per acre with 10.5 per acre across the treatment area. The average dbh of the old growth trees is 20.1 inches and the largest old growth tree measured was 28.6 inches dbh.

Parsnip, Outlet and West Valley Riparian Treatment Areas

The treatment areas within the Parsnip, Outlet and West Valley riparian treatment areas resemble the same stand structure and composition of the West Valley allotment treatment area described above. Due to the similarities in treatment stands as well as the limited juniper treatment and relatively small treatment areas within all three of the riparian areas, plot data was only collected within the treatment area of the West Valley Treatment Area.

Walk through exams and ocular estimations in conjunction with GIS estimations of canopy cover, diameter and densities were utilized to compare the treatment areas. Due to the similarities in stands across all of the treatment areas the plot data collected within the West Valley allotment is used as a proxy for existing stand conditions across all four treatment areas.

The Parsnip (157 acres) Outlet (88 acres) and West Valley (37 acres) Riparian Treatment areas lie within riparian areas and therefore may yield a slightly larger average diameter due to the increase in water availability and resulting improved growing site. However, the walk through exams of these areas revealed that any variation in average diameter is slight and would be negligible when stratified across the treatment area. Effects analysis would not change or yield different results due to a slightly better growing site or increased growth rates. The overall site characteristics and biological adaptations of western juniper remain relatively constant across all treatment areas.

3.11.4 Environmental Consequences

3.11.4.1 Alternative 1 - No Action

Direct and Indirect Effects of the No Action (Across all Treatment Areas)

Lack of treatment will continue to move the vegetation composition away from the desired condition as the encroachment of western juniper continues over time throughout the treatment area.

In order to analyze the possible effects of no treatment context regarding historical range and densities as well as general life cycle, competitive and site specific adaptation abilities of the species must be considered. The historical range and density of this species is discussed in the existing condition portion of the report above. The following narrative provides context regarding the basic biology of western juniper as well as effects on the environment resulting from juniper expansion under the no treatment alternative.

Biology of Western Juniper

Western juniper reproduces from seed. However, some trees have the ability to sprout from cambial tissue above the soil surface after they have been cut (Tirmenstein et al 1999). Seed production is highly variable across sites and years. Seed dispersal occurs through gravity, overland flow and animal transport. Seeds are dormant immediately following seed drop with germination enhanced by cool, moist stratification. Germination from one seed crop may span

several years. The long seed life along with extended dormancy results in highly persistent seed banks. (Miller et al 2005)

Western juniper seedlings direct most of their growth into developing a substantial tap root over the first ten years of life with little development of the lateral roots. After about ten years the tree begins developing an extensive lateral root system. The lateral root system can grow up to five times the height of young trees (30 – 40 years old). The lateral roots account for approximately 65 percent of the total root biomass in trees 30 to 35 years old. These trees develop a massive fine root mat system within the upper portions of the soil. The tap root typically declines in development as the tree loses their juvenile foliage in shallow soils but can continue to develop in mature trees growing in deep soils. (Miller et al 2005 & Bedell et al 1993)

Above ground growth of western juniper is relatively slow in the early stages as the root system develops. The average growth during the first 10 years averages 1.18 to 1.58 inches per year and increases to 3.54 to 6.57 for older trees up to 100 years of age. Leaf canopy growth is relatively slow in the first 35 to 45 years but increases at age 45 -50 years. (Miller et al 2005)

Environmental Effects of Range and Density Expansion

The increase in range and density of western juniper within the treatment areas will continue to alter critical functions of the associated ecosystem. Continued expansion of this species without the natural control typically provided by a higher fire frequency can have increasing negative effects on any native competing vegetation.

These effects include:

- Reduced water availability
- Reduced nutrient availability
- Reduced understory vegetation cover
- Overall Reduction in soil productivity

Adaptations of this species allow it to tolerate relatively large environmental changes. Allocation of resources in young trees is one adaptation that allows the species to successfully compete with other native species. Juvenile and small adult western juniper reduce the allocation of resources to branches and trunks allowing larger portions of dry mass to be allocated to the foliage and roots than mature trees have the ability to do. This optimizes photosynthetic capacity and uptake of water and nutrients. (Miller et al 2005)

Water and nutrient cycles have exhibited noticeable changes in systems affected by western juniper expansion (Miller et al 2005).Western juniper effects water availability through three different processes. These include interception, transportation and increased overland flow.

Studies show that western juniper canopy can significantly reduce the amount of precipitation reaching the soil surface. The canopy of western juniper can act as an interceptor of precipitation. As precipitation falls in the form of snow or rain a portion of it is intercepted by the foliage, branches and trunk of the tree. A large portion of the intercepted precipitation

evaporates and never reaches the soil below. The rate of interception increases as the canopy cover increases over time. (Miller et al 2005)

Effective transpiration of water through the tree reduces the water availability to competing species in western juniper dominated woodlands. Transpiration involves the movement of water from the soil through the root system into the leaves and branches of the tree. Water is then transpired into the atmosphere as part of the normal living and growing process of the tree. Juniper trees have the ability to utilize water earlier in the spring season than other vegetation on the same site (Miller et al 2005). This provides the species with a competitive advantage for the use of available water. Predicted water depletion rates resulting in the presence of moderately stocked juniper stands (30 trees per acre) suggest that the growing season can be shortened by as much as four to six weeks on the site (Miller et al 2005).

Western juniper dominated sites have exhibited a decrease in ground cover of shrub and herbaceous vegetation, particularly in areas with shallow-root restricting layers. This reduction can result in an increase in bare mineral soil present on site increasing the potential for overland flow of water during large storm events. Greater plant cover, density and dispersion offer protection from raindrop impact and can slow the movement of water across the soil surface reducing soil erosion. Lack of plant cover limits the ability of the site to slow the flow of water enough to infiltrate the soil surface. This increase in overland flow reduces the amount of water available in the soil as well as increasing the potential for erosion and sedimentation. The erosion and sedimentation caused by an increase in overland flow can cause a reduction in soil productivity over time. (Miller et al 2005)

Western juniper has a longer active period than other vegetation that typically has the potential to occupy the same site. This species can be active in early spring, late fall and winter in warmer basins. Most species are dormant during the majority of these time periods allowing juniper to utilize the readily available soil nutrients. The expansion and formation of western juniper woodlands into the sagebrush grassland has demonstrated the potential to alter the spatial distribution of soil nutrients. If erosion increases as a result of juniper woodland development, the potential loss of nutrients off site in sediment will cause a reduction in community productivity. (Miller et al 2005)

The above factors all contribute in a cyclical manner to a change in ecosystem function and a reduction in native competing vegetation in western juniper dominated stands. Lack of water and nutrient availability reduce the occurrence of ground vegetation in the understory creating areas of bare soil which further inhibit water infiltration and increase overland flow. Increased overland flow increases the potential for soil erosion and sedimentation further reducing soil productivity.

Specific Effects to Treatment Areas

As exhibited in Figure 27 and table 45 above, the largest component of western juniper within the treatment areas fall into the lower diameter ranges and do not exhibit old growth characteristics. Fifty two percent of the trees per acre fall into the 6 inch or less diameter class and seventy five percent fall into the 12 inch or less diameter class. This stands' largest

component is composed of young, newly developed junipers that are expanding in density and range. Table 46 below exhibits the current diameter distribution of the stands in two inch increments.

Western Juniper Diameter Distribution												
DBH Range	0.1-3"	4" -6"	7"- 9"	10"- 12"	13" -14"	15"- 16"	17"- 18"	19"- 20"	21"- 22"	23"- 24"	>24"	Total
TPA	61	29	24	18	16	8	8	5	3	1	3	175
Percentage of Stand	35%	17%	14%	11%	9%	5%	5%	3%	2%	1%	2%	

Table 46. Data derived from plot data within West Valley Treatment Area. This data was used to estimate conditions across all four treatment area stands.

Due to the adaptation features of western juniper listed above and its' ability to out compete native vegetation species the treatment area will most likely continue to transition to a single species dominated system. The large component of younger trees in this stand and the current lack of understory vegetation across large portions of the treatment area indicate that the stand is moving into the later phases of woodland succession. Miller et al 2005 describes the three phases of woodland succession as the following:

Phase I: Trees are present but shrubs and herbs are the dominant vegetation that influences ecological processes (hydrologic, nutrient and energy cycles) on the site.

Phase II: Trees are codominant with shrubs and herbs and all three vegetation layers influence ecological processes on the site.

Phase III: Trees are the dominant vegetation and the primary plant layer influencing ecological processes on site.

The current condition of the treatment areas exhibit a mix of phase II and phase III characteristics. This classification is based on the lack of understory vegetation (see range report page) coupled with the dominance of western juniper across the treatment areas.

The adaptation features of the younger juniper (30 -45 years) within the stand as well as the reproduction ability and persistent seed bank of the species will most likely continue to move these stands into the later successional phases as described above. A summary of the adaptation capabilities of these younger trees include:

- Extensive lateral root system and massive fine root mass just below the soil surface provides the ability to effectively compete for soil moisture and nutrients as well as impede growth of competing species.

- Active transpiration and nutrient cycling over a longer period of time than other competing species (early spring, late fall and winter in warm years or warmer regions).

- Optimized water and nutrient uptake capability through reallocation of energy to the roots and foliage.

- Early development of an extensive tap root (first ten years of development), particularly in deeper soils.

Under a no treatment alternative, the large component of young trees mixed with the increasing canopy of the larger more mature trees will continue to have a negative impact on any competing understory or overstory vegetation currently present on the site. The rate of species conversion and continued movement to a later juniper successional phase is dependent on many physical and biological factors and therefore difficult to predict. However, the trend toward the most advanced seral phase and increasing reduction in on site, native competing vegetation is apparent and can be expected to continue unless altered by a natural or human caused disturbance.

Cumulative Effects of the No Action

As stated above in the Direct and Indirect analysis western junipers are expected to continue to increase in density, size and range within all three treatment areas. Over time this trend will continue to reduce and may eliminate individual species of native competing vegetation. There is no accurate means to quantify the exact effects of continued juniper expansion on other vegetation where treatment is excluded. However, past history in conjunction with the current on site trend and scientific studies of western juniper sites as well as their biological abilities and competitive adaptations lead to a firm hypothesis that over time these areas will mature into western juniper dominated, late seral phase conditions with little species diversity.

Figure 29. 1910 Photograph. View looking to the Northwest. Eagle Peak in the background.

Figure 30. 1910 Photograph. View looking to the Northwest. Eagle Peak in the background.

Figure 31. 1990s Photograph. View looking to the Northwest. Eagle Peak in the background.

The series of three photographs above were taken within the analysis area and exhibit the change in western juniper population and densities over time. Figure 29 is a larger scale perspective of the area and provides historical perspective of the distribution of western juniper across the landscape. The majority of trees are located within the pronounced draw located along the right side of the photo and along the upper slopes of the drainages.

Figure 30 & 31 were taken from a different angle and at a closer view than the first photo with the same Eagle Peak in the background. In comparison these two photos have slightly different angles and were not taken from the exact same photo point. However, both photos capture a large portion of the same landscape and therefore provide a relevant comparison over time. Figure 30 was taken in 1910 and displays the occurrence of western juniper along the ridgelines with sparse scattered occurrences in the foreground. In contrast Figure 31 was taken in the 1990s and displays a dense population of western juniper throughout the foreground and background.

These photographs provide insight to the expansion of western juniper over the past 80 to 90 years and are a relative guide in predicting the future cumulative effects of no treatment within the western juniper woodlands.

As the tree densities increase canopy closure will also continue to increase. Closed canopy conditions in western juniper stands (> 20 percent canopy closure) typically result in little ground cover reducing the amount of sagebrush and grasses as canopy closure continues to increase over time (Miller et al 2005). The lack of ground cover in western juniper woodlands under closed canopy conditions increases the risk of site erosion, sediment yield and loss of soil productivity (Pierson et al 2002). Lack of soil productivity will continue to have a negative effect over time on competing understory vegetation as well as overstory species present on site such as ponderosa pine and the various hardwood species such as willows and aspen that would typically occupy the riparian areas located within the treatment areas.

3.11.4.2 Alternative 2 - Proposed Action

Direct and Indirect Effects of the Proposed Action

West Valley Treatment Area

Implementation of the proposed action will reduce the number and range of western juniper within the West Valley Treatment Area. As displayed in the existing condition above, the majority of juniper trees within the treatment area do not exhibit old growth characteristics. Removal of all trees not exhibiting old growth characteristics has the potential to reduce the trees per acre by 94% of what currently exists on the site based on the plot data collected. However, as stated above old growth trees tend to grow in clumps within areas that have not historically been affected by fire (rocky ridges and draws, rock outcroppings and the upper edge of the drainages). Therefore random plots spread throughout the treatment area may not provide a completely accurate representation of the old growth populations. It is hypothesized that the number of old growth trees is slightly larger than what was captured in the plot data due to their natural clumpy distribution across the landscape. Therefore the reduction in trees per acre will most likely be slightly less than what is estimated from the plot data.

The reduction in trees per acre across the treatment area will also alter the diameter distribution of the stand. As represented by the plot data figure 31 below provides an example of what the diameter distribution as well as trees per acre may look like post treatment.

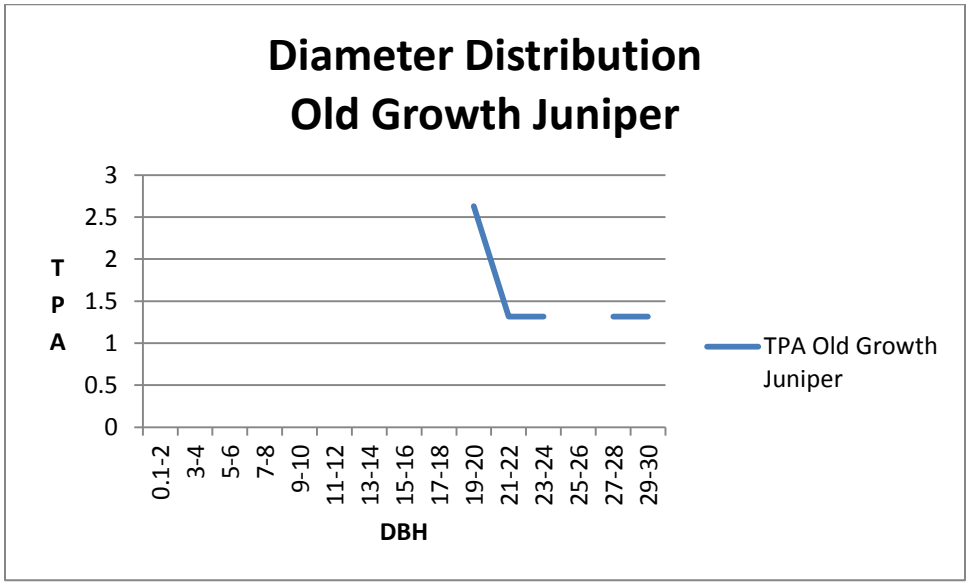


Figure 32

The trees per acre displayed in figure 32 above represents the number of trees remaining after treatment averaged across the 1364 acres. The number of trees per acre present within isolated clumps post treatment is anticipated to be much greater when averaged on a scale relevant to the clump size. These clumps are anticipated to be in areas that have historically not been affected by fire. This reduction in the number and distribution of western juniper across the 1364 acre treatment area will move the stand conditions toward a condition that would closer resemble historic condition as described in the SSERS FEIS 2008, Miller et al 2005 and displayed in the onsite photos 3 and 4 above.

The age and diameter distribution will be shifted to the older and larger end of the scale respectively. This treatment will remove the majority[8] of the younger small diameter trees from the treatment area shifting the distribution primarily to old growth trees within the larger diameter classes (18 to 24 inches dbh).

Without strong regeneration potential it appears that this action could potentially move the stand toward a state that could be detrimental to the species within the site due to future mortality and limited stocking of younger trees to replace the older trees.

However, western juniper is a long-lived species; a single tree may live over 1000 years (Miller et al 2005). The old growth characteristics that will be used to identify retention trees are designed around trees that were present pre-European settlement which is approximately 150 to 160 years ago (SSERS FEIS 2008 pg. 49 & Miller et al 2007). Although we are classifying these trees as old based on their presence in the pre-European era many of the selected leave trees may

[8] It is anticipated that some small seedling size trees will be missed during treatment due to cover from downed larger trees, brush or terrain features

be relatively young trees compared to the life span potential of the species. The long life span of these trees will continue to provide future seed source for germination of new seedlings.

In addition, this treatment will not affect the persistent seed bed that has accumulated over the years in the soil beneath the stand. Western juniper seedlings will continue to develop in the stand after treatment unless treated with fire or other hand or mechanical method. The rate at which regeneration will occur is dependent on many factors including, amount of seed stored in the soil, future climate conditions and availability of micro sites for establishment. Therefore the post treatment rate and intensity of regeneration in these stands cannot be accurately predicted.

Western juniper also has the capability to sprout from cambial tissue just above the soil surface. However, the success rate of this reproductive method has not appeared to be successful in past treatments on the forest when the tree is cut below any green foliage. Proper cutting methods should limit the success of this reproduction method.

Due to the current lack of understory fuels in the treatment area as well as surrounding lands, fire frequency is not anticipated to increase in the near future. Western juniper will continue to have a presence of younger trees as a result of the smaller seedlings missed during the treatment[1] as well as future seedlings that develop from seed as result of the older remaining seed trees and the residual seed bank in the soil.

The scale of beneficial effects to native competing vegetation in the understory as well as overstory is difficult to estimate. "The level and speed of community response depends on several factors including post-treatment weather conditions and management, grazing history, site potential (soils and plant community), seed banks, and plant composition prior to treatment" (Miller et al 2005). Past studies have shown an increase in water capture following cutting of western juniper woodlands compared to adjacent uncut woodlands. Biological diversity of understory herbaceous plant species has increased in past treatments that removed western juniper. This increase is typically due to emergence of perennial and annual forbs following cutting or burning in western juniper stands. However benefits may be site specific. (Miller et al 2005) See the South Warner Grazing EA Range Report for more detailed analysis of effects to understory grass, forb and shrub species.

Due to an expected increase in available soil nutrients and moisture as well as available sunlight there will be some beneficial effects to associated overstory species such as ponderosa pine and hardwood species associated with wet or riparian areas. However, this treatment area is a harsh growing site with respect to non-western juniper tree species. The site is composed of shallow and rocky soils and contains a variety of competing grass and shrub species. Benefits to non-western juniper tree species are expected to be isolated to micro-sites that contain available seed sources and adequate moisture and soil conditions. The greatest benefit of treatment is anticipated to be within the understory grass, forb and shrub species.

The proposed treatment within the West Valley Treatment Area will greatly reduce the range and density of the younger, non-old growth trees within the designated treatment area. However, the treatment will not completely eliminate the occurrence of young junipers in the stand. The post treatment stand will closely resemble pre-settlement conditions and assist in restoring proper ecosystem functions as well as increasing overall species diversity in the stand.

Parsnip, Outlet & West Valley Riparian Treatment Areas

Treatment within these areas will only consist of falling non-old growth trees to create a barrier to livestock in order to restrict access and associated impacts to the riparian areas. Western juniper removal is estimated to be minimal within these treatment areas relative to the existing stocking levels. Due to the resilience of the species and the reproductive adaptations discussed above the effects to western juniper densities and associated native competing species is expected to be negligible within these treatment areas.

Cumulative Effects of Proposed Action

West Valley Treatment Area (WVTA)

A list of past and future foreseeable activities is included in Appendix F of the South Warner Grazing EA. The cumulative effects of the proposed action to western juniper and associated overstory vegetation was analyzed for on a watershed scale based on the designated 6th field Hydrologic Unit Code (HUC). The West Valley Treatment Area falls within the Parsnip Creek 6th field HUC.

Past Activities

There have been three past western juniper treatments on USFS lands located within the Parsnip Creek 6th field HUC . These treatments are located both within and in close proximity to the WVTA (See map 2 in Appendix A). The first treatment was completed in 2003 and consisted of approximately 80 acres of hand felling. This entire treatment area lies within the current WVTA. The second treatment was complete in 2005 and consisted of 49 acres (34 acres within WVTA and 15 acres directly adjacent to WVTA) of mechanical treatment. The most recent treatment was completed in 2008 and consisted of approximately 81 acres of hand treatment (49 acres within WVTA and 32 acres in close proximity to WVTA).

In addition, approximately 29 acres of western juniper was treated on private land in 2008 directly adjacent to the WVTA. Past treatments of western juniper total approximately 239 acres within the Parsnip Creek 6th field HUC. The past treatments listed above removed the majority of western juniper within their respective treatment areas.

Other past activities over the last 30 years include wildland fire and associated fire salvage activities (see map 2 in Appendix A). The 2001 Blue Fire affected approximately 8,005 acres within the Parsnip Creek 6th field HUC. This portion of the fire occurred primarily in conifer dominated stands that contained little to no western juniper component. Fire salvage activities within the HUC included approximately 3,274 acres of proposed treatment. However, due to a prolonged planning and analysis period and the deterioration rate of the standing wood only a portion of this acreage was actually harvested. The areas that were harvested were completed in 2004. The harvest activities were designed to remove commercial timber (ponderosa pine & white fir) and therefore had little impact on western juniper dominated stands as a pure function of treatment design and fire location on the landscape.

There was one fire within a western juniper dominated stand in 2001 consisting of approximately 72 acres. No salvage activities were conducted within this stand post fire. Mortality rates

resulting from this fire are unknown. Therefore, 100% mortality is assumed for the purposes of analysis in order to consider all possible cumulative effects.

There is approximately 5,938 acres of western juniper dominated landscape within the 6th field HUC. The total area of western juniper woodlands affected by the proposed treatment in the WVTA as well as the areas affected by past treatment activities and fire is approximately 1675 acres. This is 28% percent of the current western juniper dominated landscape within this 6th field HUC.

The reduction in western juniper within the treatment area appears to be dramatic from a pure trees per acre perspective. However, the treatment is designed to assist in reversing over 100 years of western juniper expansion and the associated negative effects to the watershed as documented in several studies and professional papers including SSERS 2008, Miller et al 1999 and Miller et all 2005. Although the initial treatment may create a significant change in the characteristics of these treatment stands (TPA, diameter distribution and species composition) cumulatively the effects are minimal when compared to the historic trend of expansion of the species within the treatment areas as well as across the landscape.

As stated above in the analysis of the no acting alternative density and range of western juniper has increased dramatically within the analysis area of the SSERS FEIS 2008 (includes this treatment area). The current range and stocking levels of western juniper are significantly outside of their historical levels as documented in the SSERS FEIS 2008 and Miller et al 2005. This project will assist in bringing these levels closer to a natural, pre-settlement condition within the treatment area. Movement of these stands toward a more historic pre-settlement condition is a major component of the desired condition for both this project and the SSERS FEIS 2008.

This project in combination with past activities will not significantly alter the current condition of western juniper on a watershed level. Cumulative impacts to the condition of western juniper on a watershed and project level basis will be minimal.

Parsnip, Outlet & West Valley Riparian Treatment Areas

Due to the small area and limited treatment within these treatment areas (See proposed action above) there will be little to no cumulative effects to western juniper associated with the proposed action in conjunction with past activities.

Foreseeable Future Activities (All Four Treatment Areas)

Foreseeable future activities in all four treatment areas include cattle grazing, firewood gathering, dispersed camping, general recreation (hunting, hiking, wildlife viewing) and fire suppression.

Cattle grazing within the WVTA will be suspended for two years following treatment in order to assist in recovery of vegetation. Western juniper treatments within the Riparian Treatment Areas are designed to reduce impacts of cattle to the associated streams and riparian areas. Cattle grazing has occurred within all four treatment areas over the past 100 to 150 years and does not appear to have a negative effect on western juniper growth rates, the ability to reproduce or expand in range.

Improper grazing management in combination with wildland fire suppression can enhance western juniper expansion. If areas are heavily grazed fires that historically limit the development of western juniper seedlings will play a significantly reduced role in the species lifecycle as a result of the lack of available fine fuels in the understory and expedient suppression tactics (Miller et al 1999 & 2005). Impacts of grazing on western juniper expansion is a consideration that is accounted for in the design and implementation of grazing methods included as part of this EA (see South Warner EA Range Specialist Report for more detail on grazing practices). Fire suppression tactics and decisions are continually evolving and are incident specific. These decisions involve many different complex factors including risk to human life and resources as well as political, economic and social ramifications and cannot be accurately predicted for the purposes of effects to vegetation.

Firewood gathering will continue within this area and may increase as a result of the available downed wood after treatment. However, this activity will be relatively short term and will continue to dissipate over time as the downed wood is either removed by the public or piled and burned. The remote nature of the project area and associated travel distance to any community will also act as a limiting factor for this activity. Over time this treatment will actually reduce the amount of firewood gathering in the area due to the reduction of western juniper within the stand. The effects of this activity on existing and future overstory vegetation will be negligible.

Although this area is used for camping, hunting and other dispersed recreational opportunities the cumulative effects of these activities on the overstory vegetation will be negligible.

3.11.4.3 Alternative 3 - Change in Livestock Grazing Numbers

Direct, Indirect & Cumulative Effects

The western juniper treatments in this alternative are identical to the proposed action. Therefore the direct, indirect and cumulative effects will be the same as the proposed action pertaining to the effects on western juniper and associated overstory tree species.

3.11.4.4 Alternative 4 - No Treatment within West Valley Treatment Area

Direct, Indirect & Cumulative Effects

The western juniper treatments in this alternative are identical to the proposed action within the Parsnip, Outlet and West Valley Riparian Treatment Areas. Therefore the direct, indirect and cumulative effects will be the same as the proposed action pertaining to the effects on western juniper and associated overstory tree species within these treatment areas.

This alternative proposes no treatment within the West Valley Treatment Area. See Alternative 1, No Action for the effects analysis of no treatment within this treatment area.

3.11.4.5 Alternative 5- Change in Livestock Grazing Numbers

Direct, Indirect & Cumulative Effects

The western juniper treatments in this alternative are identical to the proposed action. Therefore the direct, indirect and cumulative effects will be the same as the proposed action pertaining to the effects on western juniper and associated overstory tree species.

3.12 Soils Resources

3.12.1 Introduction

This report focuses on the effects of the alternatives on soil productivity within the Outlet, West Valley and Parsnip Allotments. The report includes affected environment, environmental consequences, and direct, indirect, and cumulative effects.

Soil is the basic resource of the forest and rangeland, and is key to the productivity of an area. Soil directly or indirectly supports all other resources. It serves as a growth medium for plants, filters biological and chemical substances and regulates water transmission. A major goal for soil resource management is long-term maintenance of soil productivity and watershed protection. This requires avoiding management actions that would irreversibly impair soil productivity. It is necessary to monitor soil productivity to detect significant changes caused by management actions. Maintaining soil productivity also requires restoring or improving soils in areas where they have been degraded. Controlling soil erosion, compaction, and maintaining the nutrient balance during range management, timber harvest, reforestation, vegetative manipulation, and post-fire rehabilitation is vital to long-term soil productivity and protection of down-stream water quality. To reduce loss of soil structure and nutrients practices would include maintaining ground cover to reduce soil loss, limiting livestock and equipment use on soils during wet weather, and prescribing low intensity fires for broadcast burns (Modoc National Forest Land and Resource Management Plan, 1991).

The Modoc National Forest Land and Resource Management Plan (LRMP) requires that project plans for activities implement appropriate Best Management Practices (BMP) and other project-specific mitigation measures for soil and water protection. This includes areas of concentrated use. The Modoc National Forest uses the allowable 15% detrimental disturbance as a measure to track the impact of disturbance on site productivity.

As a minimum, 85% of areas affected by soil-disturbing activities will not exceed soil property thresholds in the Soils Guidelines A-G in the LRMP, 1991 (4-21, 22). This includes maintaining mineral organic matter in 85% of its natural condition in the upper 12 inches of the soil profile, porosity at least 90% of its natural condition, a minimum of 30% of the soil surface covered with intact duff, five large logs per acre, and remaining within the allowable soil loss.

Soil quality analysis standards provide threshold values that indicate when changes in soil properties and soil conditions would result in significant change or impairment of the productivity potential, hydrologic function, or buffering capacity of the soil. Detrimental soil disturbance is the resulting condition when threshold values are exceeded.

3.12.2 Scope of Analysis, Methodology, and indicators

The 1983 "Soil Survey of Modoc National Forest Area, California" was used as the basis for interpreting and describing the soil resource. As required in the LRMP the soil survey is to be field-verified for vegetation manipulation projects. It was determined, upon field investigation, that the soils were mapped correctly in the project area where juniper reduction is proposed in Alternatives 2, 3, and 5.

The Outlet C&H, West Valley C&H, and Parsnip C&H Allotments encompass the following Soil Map Units (SMU):

- 299 acres are in SMU 111 Anatone-Bearskin-Smarts Family Association, 2 to 20 percent slopes.
- 1835 acres are in SMU 112 Anatone-Bearskin-Smarts Family Association, 20 to 40 percent slopes.
- 41 acres are in SMU 117 Anatone-Smarts Families-Rock Outcrop Association, 40 to 70 percent slopes.
- 376 acres are In SMU 120 Bakeoven Family-Rock Outcrop Association, 20 to 60 percent slopes.
- 382 acres are in SMU 130 Bieber-Barnard Families Complex, 1 to 120 percent slopes.
- 413 acres are in SMU 145 Cowiche-Casuse Families-Rock Outcrop, Tuff Association, 2 to 30 percent slopes.
- 1588 acres are in SMU 153 Deven-Bieber-Pass Canyon Families Association, 1 to 15 percent slopes.
- 2942 acres are in SMU 154 Deven-Pass Canyon Complex, 1 to 10 percent slopes.
- 660 acres are in SMU 156 Deven-Pass Canyon-Keating Families Complex, 15 to 35 percent slopes.
- 795 acres are in SMU 159 Deven Family-Rock Outcrop Associaton, 1 to 20 percent slopes.
- 3,111 acres are in SMU 180 Hiibner-Deven-Keating Families Complex, 20 to 60 percent slopes.
- 80 acres are in SMU 181 Hiibner-Ruckles Families Complex, 15 to 35 percent slopes.
- 1,400 acres are in SMU 191 Keating-Deven Families Association, 1 to 20 percent slopes.
- 91 acres are in SMU 196 Lamondi-Smarts deep Families Complex, 40 to 60 percent slopes.
- 458 acres are in SMU 224 Pass Canyon-Fordice-Gwin Families Association, 1 to 20 percent slopes.
- 849 acres are in SMU 225 Pass Canyon-Fordice-Gwin Families Association, 20 to 40 percent slopes.
- 56 acres are in SMU 237 Ridd-Los Gatos-Gwin Families Association, 5 to 35 percent slopes.

- 376 acres are in SMU 240 Rock Outcrop-Rubble Land-Bakeoven Family Association, 40 to 90 percent slopes.
- 754 acres are in SMU 259 Smarts-Mascamp-Demasters deep Families association, 20 to 40 percent slopes.
- 146 acres are in SMU 268 Supan-Supan deep-Pass Canyon Families Association, 1 to 20 percent slopes.
- 408 acres are in SMU 273 Vipont-Ginser-Anatone Families Association, 15 to 40 percent slopes.
- 2 acres are in SMU 274 Aquolls, 0 to 5 percent slopes.

The SMU characteristics in Table 47 should be used to determine management limitations in order to remain within LRMP.

Table 47. Soil Map Unit Characteristics for the Outlet C&H, West Valley C&H, and Parsnip C&H Allotments.

SMU	Rooting Depth inches	Erosion Hazard	Susceptibility to Burn Damage	Surface Layer
111	8 to 40	Low to Moderate	Low to Moderate	Cobbly loam, Stony loam
112	8 to 40	Moderate to High	Moderate	Cobbly loam, Stony loam
117	10 to 40	High to Very High	Moderate to High	Cobbly loam, Stony loam, Rock outcrop
120	8 to 20	Moderate to High	Low	Very cobbly fine sandy loam, Rock outcrop
130	10 to 40	Low to Moderate	Low	Very cobbly loam, Cobbly loam
145	7 to 40	Low to High	Low to Moderate	Loam, Rock outcrop
153	8 to 20	Moderate	Low	Cobbly loam, Very cobbly loam
154	10 to 20	Moderate	Low	Cobbly loam, Very cobbly loam
156	8 to 40	Moderate to High	Moderate	Cobbly loam, Cobbly clay loam, Clay loam
159	8 to 16	Moderate	Low	Cobbly loam, Rock outcrop
180	10 to 40	Moderate to High	Moderate	Stony loam, Cobbly loam, Cobbly clay loam, Clay loam
181	10 to 40	Moderate	Moderate to High	Stony loam, Very cobbly loam
191	10 to 40	Low to Moderate	Low	Cobbly clay loam, Clay loam, Cobbly loam
196	40+	High	Moderate	Gravelly loam, very gravelly loam, Stony loam
224	10 to 40	Low to	Low to Moderate	Very cobbly loam, Very

		Moderate		stony loam, Extremely cobbly loam
225	10 to 40	Moderate to High	Moderate to High	Very cobbly loam, Very stony loam, Extremely cobbly loam
237	10 to 40	Low to Moderate	Low to Moderate	Cobbly loam, Gravelly loam, Very cobbly loam
240	7 to 20	High to Very high	Moderate	Rock outcrop, Rubble land, Very cobbly fine sandy loam
259	10 to 40+	Moderate to High	Low to Moderate	Stony loam, Very cobbly loam, Very gravelly loam, Loam
268	10 to 40+	Low to Moderate	Low to Moderate	Loam, Very cobbly loam
273	10 to 40	Moderate to High	Moderate	Very gravelly loam, Cobbly loam, Very cobbly loam, Extremely cobbly loam
274	40+	Moderate	Low	Variable

3.12.3 Affected Environment

Outlet Allotment

On an upland site adjacent to the gravel pit (within a juniper treatment), bare soil was 14% of the ground cover and erosion pavement was 3%. Litter, rock and live vegetation provided 30%, 5%, and 48% of the ground cover respectively. Juniper cover was estimated at 7% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately 50/50). Litter and live vegetation formed 78% of ground cover and appeared to occur in amounts adequate enough to prevent accelerated erosion.(1) Minor pedestaling was observed. In almost all occurrences the pedestaling could be interpreted as non-erosional or historic as it was rarely found in a flow pattern. Pedestals can also be caused by non-erosional processes such as frost heaving or through soil or litter deposition on and around plants (Hudson 1993). Active erosional features, such as pedestaling, rills, and gullies were rarely observed in the uplands.

On another upland site adjacent to the South Fork of the Pit River, bare soil was 14% of the ground cover and erosion pavement was 8%. Litter, rock and live vegetation provided 24%, 26%, and 28% of the ground cover respectively. Juniper cover was 31% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately 60/40). Litter and live vegetation formed 52% of ground cover and appeared to occur in amounts adequate enough to prevent accelerated erosion. (1) Minor pedestaling was observed. In almost all occurrences the pedestaling could be interpreted as non-erosional or historic as it was rarely found in a flow pattern. Pedestals can also be caused by non-erosional processes such as frost heaving or through soil or litter deposition on and around plants (Hudson 1993). Active erosional features, such as pedestaling, rills, and gullies were rarely observed in the uplands.

A 2009 survey indicated that a nearby dry meadow key area adjacent to the South Fork Pit River was in "low" overall condition. Bare soil covered 9% of the site and early seral plants consisted of 98% of the species composition. A 2011 survey, while not recreating the 2009 study, did indicate a very similar amount of cheatgrass in the area (~33% in 2009 and ~29% in 2011). However, early seral species, especially annual forbs, appeared less common while late seral perennial graminoids were the dominant understory vegetation. (1)

NRCS studies within the allotment found that perennial grassland sites generally had expected suites and distributions of appropriate species. Plants were vigorous and were contributing litter to the soil surface. Shrub communities tended to exhibit understories of vigorous perennial and mixed forbs, but numerous exotic annual grasses were also observed. Where juniper invasion was advanced, shrubs had generally been eliminated from the plant community, bare ground was higher than expected for the site, and cheatgrass was abundant.

Active erosional features, such as pedestaling, rills, and gullies were rarely observed in the uplands. In almost all occurrences the noted pedestaling could be interpreted as non-erosional or historic as it was rarely found in a flow pattern. Pedestals can also be caused by non-erosional processes such as frost heaving or through soil or litter deposition on and around plants (Hudson 1993).

Bare soil was present in consistent amounts, but plants and litter were well distributed across the allotment and appeared to be protecting remaining soils on the site. Although exotic grasses were present, most of the allotment appeared to be dominated by native vegetation. Juniper treatments have been previously implemented, but encroachment is still occurring on tables, flats, and valley bottoms within the allotment. (1)

West Valley Allotment

On a dry upland site within a juniper treatment, bare soil was 4% of the ground cover. Litter, rock, and live vegetation provided 31%, 5%, and 60% of the ground cover respectively. (1)

On another dry upland site, bare soil was 15% of the ground cover. Litter, rock and live vegetation provided 8%, 44%, and 33% of the ground cover respectively. (1)

Active erosional features, such as pedestaling, rills, and gullies were rarely observed in the uplands. In almost all occurrences the noted pedestaling could be interpreted as non-erosional or historic as it was rarely found in a flow pattern. Pedestals can also be caused by non-erosional processes such as frost heaving or through soil or litter deposition on and around plants (Hudson 1993).

Bare soil was present, but plants and litter were fairly well distributed. All plants in the allotment, including natives, were vigorous and reproducing but uplands remain susceptible to widespread juniper encroachment. (1)

Parsnip Allotment

On a dry upland site adjacent to the livestock trail in the South Pasture, bare soil was 14% of the ground cover and erosion pavement was 3%. Litter, rock and live vegetation provided 28%, 0%, and 55% of the ground cover respectively. Juniper cover was 22% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately 50/50). (1)

On a mesic upland site above Parsnip Creek in the South Pasture, bare soil was 8% of the ground cover. Litter, rock and live vegetation provided 8%, 26%, and 58% of the ground cover respectively. Juniper cover was 7% across the site, with an understory of litter (needle-cast and small branches) or live vegetation (approximately 40/60). (1)

Active erosional features, such as pedestaling, rills, and gullies were rarely observed in the uplands. In almost all occurrences the noted pedestaling could be interpreted as non-erosional or historic as it was rarely found in a flow pattern. Pedestals can also be caused by non-erosional processes such as frost heaving or through soil or litter deposition on and around plants (Hudson 1993).

Bare soil was present (8-14%), but not excessive, and plants and litter were well distributed across the allotment and appeared to be protecting remaining soils on the site. Native forage plants were vigorous and reproducing, and dominated most sites. Juniper encroachment was widespread. (1)

There is a Little Parsnip Creek exclosure that surrounds a system of springs and the associated riparian area that predominately lies in T38N R14E in the N1/2 of the NW 1/4 of Sec 12. Cattle have been entering the exclosure causing trampling in the springs and associated riparian area.

3.12.4 Environmental Consequences

3.12.4.1 Alternative 1

Direct and Indirect Effects
With Alternative 1 grazing would not be authorized on the West Valley, Outlet, and Parsnip allotments.

All structural range improvements currently in place for control or management of livestock would be removed such as fences and water developments.

It is expected that soils standards and guidelines would be met under this alternative with the cessation of livestock grazing. The absence of livestock grazing would increase vegetation through time resulting in increased soil organic matter, root mass, and ground cover. This would improve soil conditions by increasing nutrients and protecting soils from storm event impacts. The exception to this is areas where juniper encroachment decreases the shrub and grass components. Without juniper reduction there will not be the expected increase in herbaceous cover that would potentially decrease runoff and soil erosion and improve soil health.

Cumulative Effects

Cumulative effects consider the combined effects of past, present, reasonably foreseeable future, and proposed management actions.

Grazing - The absence of livestock grazing would increase herbaceous vegetation through time resulting in increased soil organic matter, root mass, and ground cover.

Juniper - There will not be juniper reduction on 1364 upland acres of the West Valley allotment. There will not be the expected herbaceous cover increase from the 1364 acres of juniper reduction that Alternatives 2, 3, and 5 will benefit from. Without juniper reduction there will not

be the expected increase in herbaceous cover that would potentially decrease runoff and soil erosion and improve soil health.

Activities –Foreseeable actions include noxious weed control, road maintenance, administrative road use, public recreational use, and small forest products gathering for personal use. These activities do not involve the use of heavy equipment other than on existing road surfaces and limited off road use by pick-up trucks. Based on the types and extent of these uses in the project area, no detrimental soil disturbance is anticipated, except from areas of concentrated firewood gathering.

3.12.4.2 Alternative 2

Direct and Indirect Effects

The proposed action has been developed to meet the project's purpose and need. The proposed action will have two components which include grazing re-authorization and updating allotment management plans (AMP). The proposed Animal Unit Months (AUMs) are 371 for West Valley Allotment; a reduction from 834 AUMs. The Outlet Allotment will remain the same with 570 AUMs. The Parsnip will remain the same with 298 AUMs.

On both the Outlet C&H and Parsnip C&H Allotments the current permitted numbers would remain the same but on the West Valley C&H Allotment the permitted numbers would be reduced to reflect actual numbers that have been grazed on the allotment. The reduction in permitted numbers will prevent soils from deterioration due to potential overuse.

The proposed structural and non-structural improvements will be used to help improve management and incorporate current direction to improve range conditions in several areas. There is the need to revitalize sage-steppe ecosystems through juniper control.

On 1364 acres of the West Valley allotment juniper that does not meet "old juniper" characteristics will be cut. By doing the juniper reduction it would increase the area of sagebrush and grassland dominated sage steppe habitat over time therefore improving the forage base for wildlife and livestock. With the cutting of juniper, erosion and sedimentation may be reduced by increased perennial grass cover. This should increase the ability of the site to capture and store water. Leaving juniper debris on the ground after cutting can intercept runoff and increase infiltration, as well as reduce evaporative loss of soil water. (2)

Juniper that does not meet "old juniper" characteristics will be felled on three riparian areas. The intent is to create barriers to livestock trailing and reduce the impacts of juniper encroachment. In the Outlet Allotment 88 acres will be felled on the South Fork Pit River, in the West Valley Allotment 37 acres will be felled on an unnamed stream reach, and in the Parsnip Allotment 157 acres will be felled on Little Parsnip Creek. The juniper in the riparian areas will be hand cut. There will not be any ground based mechanical equipment used or burning.

Cumulative Effects

Cumulative effects consider the combined effects of past, present, reasonably foreseeable future, and proposed management actions.

Grazing - Current grazing numbers will be allowed with the expected forage increase from the 1364 acres of juniper reduction.

Juniper Reduction – There will be juniper reduction on 1364 upland acres of the West Valley allotment. With juniper reduction there will be an expected increase in herbaceous cover which would potentially decrease runoff and soil erosion. Juniper reduction and associated activities resulting from the West Valley Allotment juniper control project will not result in detrimental soil disturbance over the allowed 15% of the harvest unit area if the LRMP is adhered to.

Alternatives1 and 4 will not benefit from the increase in herbaceous cover from the 1364 acres of juniper reduction as in Alternatives 2, 3, and 5.

The juniper felling in the riparian areas will be hand cut creating no soil disturbance or detrimental soils impacts. There will not be any ground based mechanical equipment used or burning. Thwarting livestock trialing will reduce channelized runoff, erosion, and stream sedimentation. With the cutting of juniper, erosion and sedimentation may be reduced by increasing perennial vegetative cover. This should increase the ability of the site to capture and store water. Leaving juniper debris on the ground after cutting can intercept runoff and increase infiltration, as well as reduce evaporative loss of soil water. (2)

Other Activities – Other foreseeable actions include noxious weed control, road maintenance, administrative road use, public recreational use, and small forest products gathering for personal use. These activities do not involve the use of heavy equipment other than on existing road surfaces and limited off road use by pick-up trucks. Based on the types and extent of these uses in the project area, no detrimental soil disturbance is anticipated, except from areas of concentrated firewood gathering.

3.12.4.3 Alternative 3

Direct and Indirect Effects

This Alternative is to implement the sage steppe restoration strategy which would restore habitat for sagebrush obligate species, improve hydrologic conditions and enhance the forage base for wildlife and domestic animals. This action is needed because of the loss of the sagebrush ecosystem across the West Valley Allotment as the density of juniper has altered many sites from sagebrush steppe to juniper woodlands dominated. The cause of this ecological shift is predominately due to anthropogenic changes, and the associated loss of vegetative, habitat, and hydrologic values.

On 1364 acres of the West Valley allotment juniper will be cut down that do not meet "old juniper" characteristics. The primary method for restoration will be hand restoration. By doing the restoration this would increase the area of sagebrush and grassland dominated sage steppe habitat over time therefore improving the forage base for wildlife and livestock. With the cutting of juniper, erosion and sedimentation may be reduced by increased perennial grass cover. This should increase the ability of the site to capture and store water. Leaving juniper debris on the ground after cutting can intercept runoff and increase infiltration, as well as reduce evaporative loss of soil water. (2)

Juniper that does not meet "old juniper" characteristics will be felled on three riparian areas. The intent is to create barriers to livestock trailing and reduce the impacts of juniper encroachment. In the Outlet Allotment 88 acres will be felled on the South Fork Pit River, in the West Valley Allotment 37 acres will be felled on an unnamed stream reach, and in the Parsnip Allotment 157

acres will be felled on Little Parsnip Creek. The juniper in the riparian areas will be hand cut. There will not be any ground based mechanical equipment used or burning.

This alternative relies on implementing the sage steppe restoration strategy in order to keep all current authorized livestock numbers on all three allotments. Permitted AUMs for West Valley Allotment are 834, Outlet Allotment are 570, and Parsnip Allotment are 298. An increase of grazing numbers on West Valley Allotment from 371 to 834 will most likely increase impacts to soil. There will potentially be a decrease of litter, ground cover, and potential plant growth accompanied by an increase in bare ground.

Cumulative Effects

Cumulative effects consider the combined effects of past, present, reasonably foreseeable future, and proposed management actions.

Grazing - An increase of grazing numbers on the West Valley Allotment will most likely increase detrimental impacts to soil. There will potentially be a decrease of litter, ground cover, and potential plant growth accompanied by an increase in bare ground.

Juniper Reduction – There will be juniper reduction on 1364 upland acres of the West Valley allotment. Permitted grazing numbers will be allowed with the expected forage increase from the 1364 acres of juniper reduction. In the juniper reduction area there will be an expected increase in herbaceous cover which would potentially decrease runoff and soil erosion. Juniper reduction and associated activities resulting from the West Valley Allotment juniper control project would not result in detrimental soil disturbance over the allowed 15% of the harvest unit area if the LRMP is adhered to.

Alternatives1 and 4 will not benefit from the increase in herbaceous cover from the 1364 acres of juniper reduction as in Alternatives 2, 3, and 5.

The juniper felling in the riparian areas will be hand cut creating no soil disturbance or detrimental soils impacts. There will not be any ground based mechanical equipment used or burning. Thwarting livestock trialing will reduce channelized runoff, erosion, and stream sedimentation. With the cutting of juniper, erosion and sedimentation may be reduced by increasing perennial vegetative cover. This should increase the ability of the site to capture and store water. Leaving juniper debris on the ground after cutting can intercept runoff and increase infiltration, as well as reduce evaporative loss of soil water. (2)

Other Activities – Other foreseeable actions include noxious weed control, road maintenance, administrative road use, public recreational use, and small forest products gathering for personal use. These activities do not involve the use of heavy equipment other than on existing road surfaces and limited off road use by pick-up trucks. Based on the types and extent of these uses in the project area, no detrimental soil disturbance is anticipated, except from areas of concentrated firewood gathering.

3.12.4.4 Alternative 4

Direct and Indirect Effects
This alternative was developed without the implementation of the sage steppe restoration strategy. This would continue to allow juniper encroachment.

As the juniper increases it has been found to be associated with a decrease in ground cover consisting of shrubs, grasses and forbs. There will be less forage available for livestock with the potential to reduce livestock numbers such as the livestock numbers on West Valley Allotment. Proposed AUMs are 371 for West Valley Allotment; a reduction from 834 AUMs. Outlet Allotment will remain the same with 570 AUMs. Parsnip will remain the same with 298 AUMs.

Juniper that does not meet "old juniper" characteristics will be felled on three riparian areas. The intent is to create barriers to livestock trailing and reduce the impacts of juniper encroachment. In the Outlet Allotment 88 acres will be felled on the South Fork Pit River, in the West Valley Allotment 37 acres will be felled on an unnamed stream reach, and in the Parsnip Allotment 157 acres will be felled on Little Parsnip Creek. The juniper in the riparian areas will be hand cut. There will not be any ground based mechanical equipment used or burning.

Cumulative Effects

Cumulative effects consider the combined effects of past, present, reasonably foreseeable future, and proposed management actions.

Grazing - Current grazing numbers will continue without the expected herbaceous cover increase from the 1364 acres of juniper reduction that Alternatives 2, 3, and 5 will benefit from.

Juniper - There will not be juniper reduction on 1364 upland acres of the West Valley allotment. Without juniper reduction there will not be the expected increase in herbaceous cover that would potentially decrease runoff and soil erosion and improve soil health.

Alternatives1 and 4 will not benefit from the increase in herbaceous cover from the 1364 acres of juniper reduction as in Alternatives 2, 3, and 5.

The juniper felling in the riparian areas will be hand cut creating no soil disturbance or detrimental soils impacts. There will not be any ground based mechanical equipment used or burning. Thwarting livestock trialing will reduce channelized runoff, erosion, and stream sedimentation. With the cutting of juniper, erosion and sedimentation may be reduced by increasing perennial vegetative cover. This should increase the ability of the site to capture and store water. Leaving juniper debris on the ground after cutting can intercept runoff and increase infiltration, as well as reduce evaporative loss of soil water. (2)

Other Activities – Other foreseeable actions include noxious weed control, road maintenance, administrative road use, public recreational use, and small forest products gathering for personal use. These activities do not involve the use of heavy equipment other than on existing road surfaces and limited off road use by pick-up trucks. Based on the types and extent of these uses in the project area, no detrimental soil disturbance is anticipated, except from areas of concentrated firewood gathering.

3.12.5.5 Alternative 5

Direct and Indirect Effects

This Alternative is to implement the sage steppe restoration strategy which would restore habitat for sagebrush obligate species, improve hydrologic conditions and enhance the forage base for wildlife and domestic animals. This action is needed because of the loss of the sagebrush ecosystem across the West Valley Allotment as the density of juniper has altered many sites from sagebrush steppe to juniper woodlands dominated. The cause of this ecological shift is predominately due to anthropogenic changes, and the associated loss of vegetative, habitat, and hydrologic values.

The authorized AUMs in Alternative Five are 670 for the West Valley Allotment. The Outlet Allotment will remain the same with 570 AUMs. The Parsnip Allotment will remain the same with 298 AUMs. This Alternative is similar to Alternative 2 and 3 except the maximum permitted numbers would be 506 Head Months after two years of rest from the juniper treatment. The permittee will be allowed to run full permitted numbers but once season of use or allowable utilization standards are met he will have to come off the allotment. The allowable utilization standards will remain the same as stated in Alternative 2 and 3.

Proposed structural and non-structural improvements will be used to help improve management and incorporate current direction to improve range conditions in several areas. There is the need to revitalize sage-steppe ecosystems through juniper control.

On 1364 acres of the West Valley allotment juniper will be cut down that do not meet "old juniper" characteristics. The primary method for restoration will be hand restoration. By doing the restoration this would increase the area of sagebrush and grassland dominated sage steppe habitat over time therefore improving the forage base for wildlife and livestock. With the cutting of juniper, erosion and sedimentation may be reduced by increased perennial grass cover. This should increase the ability of the site to capture and store water. Leaving juniper debris on the ground after cutting can intercept runoff and increase infiltration, as well as reduce evaporative loss of soil water. (2)

Juniper that does not meet "old juniper" characteristics will be felled on three riparian areas. The intent is to create barriers to livestock trailing and reduce the impacts of juniper encroachment. In the Outlet Allotment 88 acres will be felled on the South Fork Pit River, in the West Valley Allotment 37 acres will be felled on an unnamed stream reach, and in the Parsnip Allotment 157 acres will be felled on Little Parsnip Creek. The juniper in the riparian areas will be hand cut. There will not be any ground based mechanical equipment used or burning.

Cumulative Effects

Cumulative effects consider the combined effects of past, present, reasonably foreseeable future, and proposed management actions.

Grazing – The proposed AUMs will be supported by the expected forage increase from the 1364 acres of juniper reduction. Grazing on the West Valley Allotment will be allowed until utilization standards or season of use are met with the maximum permitted AUMs being 670.

Juniper Reduction – There will be juniper reduction on 1364 upland acres of the West Valley allotment. With juniper reduction there will be an expected increase in herbaceous cover which would potentially decrease runoff and soil erosion. Juniper reduction and associated activities resulting from the West Valley Allotment juniper control project will not result in detrimental soil disturbance over the allowed 15% of the harvest unit area when the LRMP are adhered to.

Alternatives1 and 4 will not benefit from the increase in herbaceous cover from the 1364 acres of juniper reduction as in Alternatives 2, 3, and 5.

The juniper felling in the riparian areas will be hand cut creating no soil disturbance or detrimental soils impacts. There will not be any ground based mechanical equipment used or burning. Thwarting livestock trialing will reduce channelized runoff, erosion, and stream sedimentation. With the cutting of juniper, erosion and sedimentation may be reduced by increasing perennial vegetative cover. This should increase the ability of the site to capture and store water. Leaving juniper debris on the ground after cutting can intercept runoff and increase infiltration, as well as reduce evaporative loss of soil water. (2)

Other Activities – Other foreseeable actions include noxious weed control, road maintenance, administrative road use, public recreational use, and small forest products gathering for personal use. These activities do not involve the use of heavy equipment other than on existing road surfaces and limited off road use by pick-up trucks. Based on the types and extent of these uses in the project area, no detrimental soil disturbance is anticipated, except from areas of concentrated firewood gathering.

3.13 Wildlife

3.13.1 Introduction

There are over 350 terrestrial wildlife species that reside on the Modoc National Forest. One of the objectives for wildlife management in Modoc National Forest Land and Resource Management Plan (Forest Service, 1991) is to provide "the distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan". The Forest Plan further states, "by maintaining vegetative diversity in a natural dispersion pattern and in sufficient amounts, the forest can meet another regulatory obligation: to maintain viable populations of the Forest's animal species by providing suitable habitat conditions" (page 3-6).

In order to provide for viability of native and desired non-native species, the Modoc National Forest Land and Resource Management Plan, as amended by the Sierra Nevada Forest Plan Amendment (Forest Service 2004), utilizes a combination of management techniques to provide animal communities.

These techniques include but are not limited to:

1) general habitat guidelines,
2) creation of networks for specified threatened, endangered, and sensitive species (e.g. northern goshawk Protected Activity Centers), and
3) Limited Operating Periods for selected species.

3.13.1.1 Habitat and Desired Conditions for Selected Species

The Modoc National Forest Plan describes guidelines to provide for various types of habitats or habitat components (Forest Service 1991 pages 4-30 to 4-33, Forest Service, 2004; and Forest Service, 2008). These guidelines include the maintenance of a diversity of habitats (e.g. riparian, late seral, and sage steppe).

Northern goshawk:

There is one Protected Activity Centers (PAC) within the analysis area (Parsnip Allotment). The vast majority of the northern goshawks on the Modoc National Forest nest in mixed conifer, white fir, and eastside pine stands; however, there has been one nest in an aspen tree on the Warner Mountains.

The desired condition for northern goshawk PAC comes from the Sierra Nevada Forest Plan Amendment Record of Decision (USDA 2004, pp 38). Stands in each PAC have: (1) at least two tree canopy layers; (2) dominant and co-dominant trees with average diameters of at least 24 inches dbh; (3) at least 60 to 70 percent cover; (4) some very large snags (greater than 45 inches dbh); and (5) snag and down woody material levels that are higher than average."

Bald eagle:

There are two bald eagle territories within the analysis area (Outlet and West Valley Allotments). Both nests are in stringers of pine with large, pre-dominant trees.

The desired condition for bald eagle is found in the Modoc National Forest LRMP (USDA Forest Service, 1991a), which is based on the Pacific States Bald Eagle Recovery Plan (US Fish and Wildlife Service, 1986). "Manage all current suitable nesting habitats (both existing and potential) and all winter roosting areas according to the Raptor Management Prescription (USDA Forest Service, 1991a page 4-26). Where opportunities arise, maintain and enhance fish, waterfowl, and other prey-base populations within the nest territory, within the closest known foraging areas, and within winter foraging area (USDA Forest Service, 1991 page 4-90)."

Golden eagle:

There are two known golden eagle nests in the South Fork of the Pit River Canyon (Outlet Allotment). Like the prairie falcon, these areas are high in the cliffs and buffered from disturbance.

Golden eagles prefer to nest in relatively open-canopied eastside pine, western juniper and sagebrush vegetation types (USDA Forest Service, 1991b page 3-105). "Nests located in forested vegetation types will be managed so that at least 25 acres surrounding the nest are designated as a golden eagle nest area (USDA Forest Service, 1991a page 4-27)."

Mule deer:

The entire analysis area is typed as deer range according to Forest Service data; the western portion of the Outlet and West Valley Allotments (as well as a small tip of the Parsnip Allotment) is categorized as critical deer winter range by the California Department of Fish and Wildlife. The juniper treatment polygon lies within critical deer winter range.

The desired condition for mule deer is found in the Modoc National Forest LRMP "Manage the winter range of each deer herd to provide a 30/70 to 50/50 ratio of thermal cover to forage ((USDA Forest Service, 1991a page 4-29)."

Prairie falcon:

Known prairie falcon nests are confined to the South Fork of the Pit River Canyon (Outlet Allotment). These areas are high in the cliffs and buffered from disturbance.

There is not a definitive Desired Condition for prairie falcon within the Modoc LRMP. Modoc National Forest LRMP direction (USDA Forest Service 1991a) for this species is as follows. "Disturbance from human activities, including foot traffic and OHV use within ¼ to ½ mile of the nest, could be detrimental to nesting and fledging during the reproductive period, March 1st to August 31st. Disturbing activities will be restricted (USDA Forest Service 1991a, page 4-28)."

Pronghorn antelope:

Only the extreme northwestern corner of the analysis area (Outlet Allotment) is typed as pronghorn range according to the USFS electronic data. Throughout the Forest, pronghorn utilize the lower elevation sage habitats mainly on the Devil's Garden and Doublehead Ranger Districts. Encroachment of junipers into open areas and the increasing density of trees in general on the Forest have resulted in decreased habitat for pronghorn.

Direction for pronghorn from the Modoc LRMP is as follows (USDA Forest Service, 1991a). "Manage for suitable portions of forb, grass, and shrub cover, referencing: a) BLM Technical Note, 347, b) Interstate Antelope Conference Guidelines, and c) the Pronghorn Habitat Capability Model. For planning purposes, use the forage requirement for pronghorn of one pound of herbaceous forage per pronghorn day per day, which is equivalent to 30 pronghorn per Animal Unit Month (AUM). Follow fence standards described in the Modoc supplement to the FSM. Analyze the effects of livestock grazing on pronghorn habitat and forage availability in AMP's (USDA 1991a, Page 4-29)." Prescribed burns in brush and juniper stands would improve forage and overall habitat capability (USDA 1991b, page 3-116).

Yellow warbler:

The Modoc National Forest Land and Resource Management Plan (USDA Forest Service, 1991a) direction, as amended, for yellow warbler is as follows: maintain viable populations [yellow warbler] through management of the Riparian Conservation Areas

(RCAs). The objective in the RCAs is to provide desired habitat conditions for plant and animal communities in riparian areas, wetlands, and meadows (USDA, 2004).

The authors of the wildlife section of the Modoc LRMP and supporting FEIS (USDA, Forest Service, 1991a and 1991b) selected yellow warbler as a Management Indicator Species of Riparian Areas, because it bred and foraged within shrubs and saplings within these habitats; it remains a MIS under the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service, 2007a). Since the warbler used a wider range of the habitat conditions than the willow flycatcher, they thought that it reflected the management of all riparian areas on the Forest (USDA 1991b, page 3-110). They also thought that livestock grazing and conifer encroachment into riparian areas were the greatest factors reducing habitat for yellow warblers.

Protected Activity Centers for northern goshawks and nest stands for bald eagles have been identified in the South Warner Grazing Analysis Area. There are prairie falcon eyries and golden eagle nests in the Pit River canyon, although there is no known Swainson's hawk. If any active nests are found during project implementation, they will be protected per Modoc National Forest LRMP direction, as amended.

Direction for the use of Limited Operating Periods for various species can be found in the Modoc Plan (Forest Service 1991 pages 4-27, 4-28, 4-89 and 4-90) as well as SNFPA ROD direction (Forest Service 2004, pages 60 and 61). Limited Operating Periods would be used to protect nesting wildlife species per Modoc National Forest Plan direction, as amended by SNFPA.

3.13.1.2 Species Discussed During the Scoping Period

There were many species that came up as part of the scoping process; some may not be covered in the terrestrial wildlife reports prepared for this project. This section will cover scoping concerns that are not covered under the BE, the MIS report, or the Landbird report.

Pronghorn antelope:

The area typed as pronghorn range (see Figure 1, Appendix G) receives little to no livestock use based on field observations. Therefore, there would be no change in AUM's, due to livestock grazing in the analysis area.

However, increases in juniper cover have lessened the areas suitability for pronghorn. Alexander and Ockenfels (1994) found that juniper decreased habitat quality and increased susceptibility to predation in Arizona. Currently, there are no plans to treat juniper in the pronghorn habitat polygon. Therefore, none of the activities discussed under the action Alternatives (2 through 4) would change the amount or quality of pronghorn habitat in the analysis area.

There are 2.68 miles of fence within the area typed as antelope range. All of the fences are constructed of barbed wire. There are no plans to change fencing within this

document. If fences impact antelope, a separate Categorical Exclusion would be initiated to alter fences.

Gray wolf:

There was a concern for gray wolf (*Canus lupus*) management expressed in the public comments. There are no known wolves in the analysis area or on the Modoc National Forest. Consequently, there is no direction concerning wolf management in the Modoc National Forest LRM, as amended. Wolves' primary habitat requirements are the presence of adequate water and prey, mainly elk and deer (http://www.dfg.ca.gov/wildlife/nongame/wolf/FAQ.html). All of the acres within the three allotments would be considered as suitable habitat, if wolves migrate to the Modoc National Forest in the future.

Based on information from the California Department of Fish and Wildlife, the historical range of the wolf in California most likely included the Sierra Nevada, southern Cascades, Modoc Plateau, Klamath Mountains and perhaps the North Coast Ranges. Wolves were extirpated from the state nearly 90 years ago (http://www.dfg.ca.gov/wildlife/nongame/wolf/FAQ.html). There has been only one verified sighting of a young male wolf (OR-7) in California within recent history. This wolf entered California on 28 December 2011. Although it spent several months in northeastern California, it sojourned back into Oregon in late spring 2013. Despite reports to the contrary, CDFW is not aware of confirmed sightings of other wolves in California (http://www.dfg.ca.gov/wildlife/nongame/wolf/FAQ.html). CDFW currently has no plans to reintroduce wolves into California.

When a wolf travels outside of the range designated by the USFWS (Wyoming, Montana, Idaho, northeastern Oregon, eastern Washington), currently, the individual gray wolf is considered as endangered pursuant to the federal Endangered Species. Any individuals found within the Modoc National Forest boundaries will be treated as such and the USFWS will be consulted as to appropriate management measures.

As evidenced by OR-7's behavior, there are no barriers to dispersal either north into Oregon or south into the Sierra Nevada. None are expected with the implementation of the activities discussed in the South Warner Grazing EA. If wolves are found within the project area, the Forest Service will pursue the use of various techniques including, but not limited to "fladry" flagging on fence lines to deter wolf predation.

Gray headed pika:

Pika is another species discussed in public scoping comments, which has no management direction in the Modoc National Forest LRMP, as amended. Pika *(Ochotona princeps)* has a patchy distribution mainly in cool, rocky habitat, primarily in high-elevation alpine habitats. Beever *et al*. (2008 in USFWS 2010) recently discovered a new population of American pika in the Hays Canyon Range of northwestern Nevada at elevations ranging from 1,914 to 2,136 m (6,280 to 7,008 ft.). The areas pika used on the Surprise Field

Office were large contiguous patches of talus (around 1 acre in size). The rocks had deep gaps, where pika could find cover.

The sighting discussed in the scoping comments is on the Jess Valley quad, but east of the analysis area. This information is from the California Natural Diversity Database (CNDDB, a Fish and Game database), which occurred earlier in the 1900's. Most of the pika sightings in the Warner Mountains occur at higher elevations. Pikas were surveyed by San Jose State University in 2006 at two locations within the Warner Mountains where pikas were known to occur historically. No pikas were discovered during these surveys.

Pikas select habitat that includes topographical features characterized by rocks large enough to provide necessary interstitial spaces for underground movement and tunneling. The Mahogany Ridge area, where the CNDDB sighting occurred, contains large talus rock patches with spaces for pika to get into, unlike most of the talus found in the South Warner Grazing EA analysis area.

The following information concerning the potential effects to pika from livestock is from the 12-month finding on the petition to list pika. "In general, pikas forage within 50 meters (164 ft) of talus. The potential for interactions between pika and livestock in the immediate vicinity of talus (i.e., within 50 m (164 ft)) depends on the site-specific conditions. In some areas, steep terrain or rock formations may largely prevent livestock from accessing talus margins; in other areas, if livestock have access to the talus edge, effects to pikas from livestock presence may not be through competition for food, but rather an indirect influence of trampling of soils or vegetation affecting vegetative growth. Livestock grazing also could reduce vegetation close to talus habitat and subsequently cause pikas to forage farther from the protective cover of talus, thus increasing energy demands and risk of predation.

However, Beever *et al*. (2003, p. 50) noted the presence of an active haypile directly under a well-traveled horse trail and several haypiles near other trails in Nevada, suggesting that livestock may not affect foraging activities. Livestock generally avoid crossing rocky talus slopes, preventing direct interactions between livestock and pikas. If interactions are happening between pika and livestock that result in a negative impact, we [USFWS] believe that these impacts occur primarily on a local scale within few pika habitats and are not a threat to overall pika populations.

Additionally, it is also possible that livestock do not affect the generalist diet of pikas. In North America, pika diet changes in the face of changing nutrition values in available plant species by shifting to an increase in sedges and forbs, especially in late summer when grasses become less nutritious. In general, cattle and horses, as ruminants, prefer grasses (graminoids) over forbs or shrubs (Shipley 1999, pp. 20-21) and can be considered specialist foragers relative to American pikas, which are generalist foragers. Furthermore, Wilkening (2007, pp. 39) found that the relative amount of forb cover, not graminoids, was the single greatest predictor of persistence for pikas in the Great Basin. USFWS concluded that the potential competition for forage between pikas and livestock

is low. In summary, the potential for interactions between pika and livestock in the immediate vicinity of talus where pikas forage depends on the site-specific conditions."

Landbird

The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by Executive Order 13186 in 2001, in addition to the Partners in Flight (PIF) specific habitat conservation plans for birds, and finally the January 2004 PIF North American Landbird Conservation Plan all reference goals and objectives for integrating bird conservation into forest management and planning.

In late 2008, a Memorandum of Understanding between the USDA Forest Service and the US Fish and Wildlife Service to Promote the Conservation of Migratory Birds (MOU) was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the Forest Service and the Fish and Wildlife Service as well as other federal, state, tribal and local governments. Within the National Forests, conservation of migratory birds should focus on providing a diversity of habitat conditions at multiple spatial scales, while ensuring that bird conservation is addressed when planning for land management activities.

The U.S. Fish and Wildlife Service (USFWS) has compiled lists of birds to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973." These birds are listed in the *Birds of Conservation Concern 2008* (USFWS, 2008). The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities. The list of the Birds of Concern for the Project Areas is in Appendix A of the Landbird Report. There are a variety of habitats represented by the species listed in Appendix A of that document. However, only those reliant on woody and herbaceous riparian plants, grasslands, and sage-steppe would be affected by the actions proposed within the South Warner Grazing EA.

3.13.2 Scope of Analysis, Methodology, and Indicators

3.13.2.1 Forest Service Sensitive Species List

The USDA Region 5 Regional Forester's Sensitive Species List, dated June 30th, 2013, was used to determine, which sensitive species would be considered in this BE. In addition, the U.S. Fish and Wildlife list for Modoc County was also reviewed.

Although yellow billed cuckoo (*Coccyzus americanus occidentalis)* and Pacific fisher (*Martes pennant)* are on the list for Modoc County, the Regional Office (based on distribution data from their review of sensitive species occurrences on the various National Forests) did not include the Modoc National Forest as being within their range.

Table 48 lists all federally listed and Forest Service sensitive terrestrial wildlife species found on the Modoc National Forest and their relationship to the South Warner Grazing Project analysis area.

Species name	Region 5 Forest Service Sensitive & Federally Listed	Species detected within or adjacent to project area?	Suitable habitat within or adjacent to project area?	Species addressed in this document?
Northern spotted owl *(Strix occidentalis caurina)*	FT	No	No	No, the range of species consists of the Medicine Lake Highlands (DHRD) for the Modoc National Forest.
Gray wolf (*Canus lupus*)	FE	No	Yes	No, the only known wolf has returned to Oregon.
American marten *(Martes americana)*	FSS	No	Yes	No, grazing not expected to affect pine and fir cover or the number of large snags.
Bald eagle (*Haliaeetus leucocephalus*)	FSS	Yes	Yes	Yes, there are two active nest territories in the analysis area.
Bings checkerspot butterfly *(Euphydryas editha bingi)*	FSS	No	No	No, project is outside of the range for this species, which is the crest of the Warner Mountains.
California spotted *owl (Strix occidentalis occidentalis)*	FSS	No	No	No, project is outside range of species, which consists of Manzanita Peak area for the Modoc National Forest.
California wolverine (*Gulo gulo luscus)*	FC/FSS	No	No	No, lack of remote, high-elevation habitat within the project area.
Fringe-tailed myotis (*Myotis thysanodes*)	FSS	No	Yes	No, grazing not expected to affect pine and fir cover or the number of large snags.
Great gray owl (Strix nebulosa)	FSS	No	No	No, no suitable habitat within the analysis area
Greater sage-grouse (*Centrocercus urophasianus)*	FSS	No	Yes	Yes, the project is about 0.6 miles from the closest historic lek.
Greater sandhill	FSS	Yes	No	No, although there is

Species name	Region 5 Forest Service Sensitive & Federally Listed	Species detected within or adjacent to project area?	Suitable habitat within or adjacent to project area?	Species addressed in this document?
crane *(Grus canadensis tabida)*				occupied habitat in Jess Valley, there is no suitable habitat within the analysis area.
Northern goshawk (Accipiter gentilis)	FSS	No	Yes	No, grazing not expected to affect pine and fir cover or the number of large snags.
Pallid bat *(Antrozous pallidus)*	FSS	No	Yes	No, grazing not expected to affect pine and fir cover or number of large snags or other potential roost sites.
Pygmy rabbit (*Brachylagus idahoensis*)	FSS	No	No	No, there are no suitable sagebrush stands with friable soils within or adjacent to the treatment units.
Townsend's big-eared bat *(Corynorhinus townsendii)*	FSS	No	Yes	No, grazing will not affect bridges or other urban structures.
Western bumble bee *(Bombus occidentalis)*	FSS	No	Yes	Yes

Table 48: USDA Forest Service Sensitive Species for the Modoc National Forest.

Symbols used: FT = threatened, FP= proposed for listing, FC = candidate for listing, FSS = Region 5 Forest Service sensitive

Northern goshawk was brought up during the public scoping period. Northern goshawks are not expected to be affected by grazing, because there is little to no livestock use within occupied habitat. Consequently, there would be little to no change in the amount of prey cover or food. In addition, livestock grazing would not affect overstory tree canopy or structure.

A paper concerning accipiter nesting in juniper was included within the scoping letter. There are over 70 known northern goshawk PACs on Warner Mountain Ranger District. None of the nests have been in juniper trees. Utilizing the Slater and Smith (2010) paper as a baseline to describe potential habitat within juniper plant communities, the analysis area does not contain suitable juniper stands for the following reasons.

First, there are no pinyon pines on the Modoc National Forest; single-leaf pinyon (*Pinus monophylla*) often co-occurs with Utah juniper (*Juniperus osteosperma*) in areas east and south of the Modoc National Forest (Forest Gauna, pers. comm.). According to Slater and Smith (2010), ninety percent of the northern goshawk nests were in pinyon pine trees. Second, the growth form of the trees within the South Warner Grazing analysis area do not resemble those discussed in the Slater and Smith (2010) paper. The juniper trees do not have the large open branchwork used as nesting platforms by northern goshawks on the Modoc National Forest. Finally, the stands within the South Warner project area are open (18.8% canopy cover based on data collected in the proposed treatment polygon). The northern goshawk nest areas had canopy covers ranging from 55 to 90 percent in Slater and Smith's study area. Since the juniper habitat does not exhibit the characteristics of suitable northern goshawk nesting habitat found in other areas, the juniper removal proposed in the South Warner EA is not expected to affect suitable northern goshawk habitat.

The species that will be carried forward for further analysis are bald eagle, greater sage grouse, and western bumble bee. See the BE for a brief discussion of the other species.

3.13.2.2 Management Indicator Species (MIS)

Management Indicator Species (MIS) are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the Modoc LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Modoc LRMP as amended.

Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area.

Habitat or Ecosystem Component	**CWHR Type(s) defining the habitat or ecosystem component [1]**	**Sierra Nevada Forests Management Indicator Species** ***Scientific Name***	**Category for Project Analysis[2]**
Riverine & Lacustrine	Lacustrine (LAC) and riverine (RIV)	Aquatic macro-invertebrates	Addressed in Aquatic MIS Report
Sagebrush	Sagebrush (SGB & LSG)	Greater sage-grouse *Centrocercus urophasianus*	3
Riparian	Montane riparian (MRI), valley foothill riparian (VRI)	Yellow warbler *Dendroica petechia*	3

Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree (chorus) frog *Pseudacris regilla*	3
Early Seral Coniferous Forest	Ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures	Mountain quail *Oreortyx pictus*	2
Mid Seral Coniferous Forest	Ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail *Oreortyx pictus*	2
Late Seral Open Canopy Coniferous Forest	Ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse *Dendragapus obscurus*	1
Late Seral Closed Canopy Coniferous Forest	Ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	American Marten *Martes Americana* Northern flying squirrel *Glaucomys sabrinus*	2 2
Snags in Green Forest		Hairy woodpecker *Picoides villosus*	2
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	Black-backed woodpecker *Picoides arcticus*	1 (The Blue Fire is greater than 10 years old)

Table 49: Selection of MIS for Project-Level Habitat Analysis.

[1] All CWHR size classes and canopy closures are included unless otherwise specified; **dbh** = diameter at breast height; **Canopy Closure classifications:** S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); **Tree size classes:** 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(>24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

[2] **Category 1:** MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.
Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.
Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

Sooty grouse and black-backed woodpecker are the only species categorized as Category 1 (species having no habitat within the analysis area); therefore, neither species will be discussed further in this analysis. The conifer adapted species such as mountain quail, American marten,

and hairy woodpecker have habitat within the three allotments; however, there are no anticipated effects from grazing on conifer cover or snag levels. Aquatic macro-invertebrates will be covered in a separate report.

The MIS identified as Category 3 in Table , are carried forward in this analysis are: greater sage-grouse, pacific tree frog, and yellow warbler. The potential direct, indirect, and cumulative effects to these species are discussed below. The analysis area includes all of the national forest system lands within the Outlet, Parsnip, and West Valley allotments on the Warner Mountain Ranger District. See Appendix 1 of the MIS report for a map of the analysis area.

3.13.2.3 Modoc LRMP Wildlife Species

The Sierra Nevada Forests Management Indicator Species Amendment Record of Decision (SNF MIS EIS, 2007) established a new set of management indicator species for forests amended by the Sierra Nevada Forest Plan Amendment (SNFPA FSEIS ROD, 2004). However, standards and guidelines delineated in the Modoc National Forest LRMP (1991) for management indicator species were retained. This section documents the effects to these species by the alternatives.

The entire project area provides habitat for mule deer and includes areas designated as deer winter range along the northern and western boundaries of the project area. Due largely to the lack of wildfire, western juniper has encroached on many portions of the project area. Juniper can serve as escape, hiding and thermal cover, but it can also significantly reduce the forage resources for mule deer when juniper encroachment is unchecked.

Mule deer populations in the area have declined significantly over the past 40 to 50 years, during a period when junipers have overshadowed and out-competed many understory shrubs and forbs on which deer rely for food. In the relative absence of wildfire, western junipers have come to dominate areas that were previously dominated by shrubs, grasses and forbs.

Alternatives 2, 3 and 4 include some cutting of western juniper which could affect thermal cover. All of these treatments would leave junipers exhibiting old growth characteristics and would only potentially affect a maximum of 1,646 of the 17,286 acres of forest system lands on the project area or less than 10 percent of the acres on the project area. Junipers on the remaining 90 percent would not be treated. This falls within the intent of the Modoc National Forest's Land and Resource Management Plan's standard of managing for 30 to 50 percent thermal cover to forage area, and some areas that may be treated would likely develop shrub canopies post treatment that would meet the 75 percent closure defined by the plan as thermal cover.

Fencing of a fen on the project area will impact a very small area and is not expected to have a measurable impact on mule deer or their habitat.

3.13.3 Affected Environment

Habitat condition was assessed using a combination of California Wildlife Habitat Relationship vegetation data (a part of the 2004 Modoc National Forest electronic vegetation dataset).

3.13.3.1 Historical Habitat Conditions

The information in this section is paraphrased from Kenneth McGarva, cattle rancher, based on his personal observations and family photographs of the analysis area. His observations are similar to those discussed in Reinkensmeyer et al. (2007), "Under historic conditions grasslands, sagebrush steppe, and old growth juniper were predominant vegetation across the sagebrush biome."

There has been a substantial amount of juniper encroachment within all three allotments. The amounts of bitterbrush and grasslands have declined significantly. Mr. McGarva remembers when areas had a ¼ mile of visibility. Now the views are obscured by juniper trees.

Currently, there is hardly any bitterbrush left in the areas that historically had a good bitterbrush component. These areas were near West Valley Spring (West Valley Allotment) and Gravelly Ford (Parsnip Allotment).

The flat areas within the analysis area had more grasslands. The area still had open country in the 1960's. This would indicate that most of the juniper is less than 100 years old, which is evidenced by their growth form (mainly pointed topped instead of rounded topped trees).

Although none of the springs or creeks have disappeared, there is significantly less water in many areas. Little Parsnip Creek used to have sufficient flow to provide irrigation to other areas. Mr. McGarva estimated that the creek now runs about ¼ of the flow that it historically did. "Tin Trough" used to provide water, but it has all but dried up.

3.13.3.2 Current Habitat Condition

Habitat within the three allotments consists of sage-steppe in western and middle portions of the allotments with mixed conifer and white fir at the higher elevations in the eastern sections of the areas. Scattered pines are found throughout the allotments often co-mingled with juniper. The Pit River, Parsnip Creek, and Little Parsnip Creek provide riparian habitats. There are localized wet meadows and fens near the springs (e.g. West Valley Spring). A quarry is found just south of canal connecting the Pit River to West Valley Reservoir.

California Wildlife Habitat Relationships System (CWHR) habitats present on three allotments are listed in Table . The CWHR system is designed specifically to classify wildlife habitat and is therefore used in the preparation of this report.

CWHR Habitat Type	Acres
Aspen (ASP)	1
Barren (BAR)	66
Bitterbrush (BBR)	106
Montane Chaparral (MCP)	147
Montane Riparian (MRI)	25
Perennial grasslands (PGS)	1,662
Mixed Chaparral (MCH)	9
Juniper (JUN)	6,284
Lacustrine (LAC)	8
Low Sage (LSG)	4,830

Eastside Pine (EPN)	513
Sagebrush (SGB)	3,037
Sierran Mixed Conifer (SMC)	378
Urban (URB)	24
Wet Meadow (WTM)	6
White Fir (WFR)	6
Total	**17,102**

Table 50: CWR habitat types for the Outlet, West Valley and Parsnip Allotments.

The occupancy of various terrestrial wildlife species was determined through a series of surveys in addition to incidental sightings. The surveys have been conducted by both USFS personnel, as well as external partners. The results of these surveys are found in the various reports.

Raptor surveys were conducted by a variety of methods. Helicopter surveys were employed to determine prairie falcon nest sites during the forest plan development to support peregrine re-introduction efforts in the early 1980's. The prairie falcon sites are centralized along the South Fork of the Pit River within the analysis area; however, many cliffs throughout the Warner Mountain RD also had prairie falcon and golden eagle occupancy.

Intensive stand searches for raptors were conducted for the West Valley Juniper Hand-felling Project (2002 and 2003), a potential hydro-electric project along West Valley Creek (2004 and 2005), and during the reconnaissance for the South Warner Grazing Analysis project (2012 and 2013). Annual bald eagle nest surveys have been conducted on the Warner Mountains since the 1990's to monitor nesting success. The two known eagle pairs occurring in the analysis area were detected during searches conducted in support of project planning. Winter bald and golden eagle surveys have been conducted along the road from Jess Valley to the western Modoc National Forest boundary in 2002, 2004, 2005, and 2007. The 2008 survey had to be aborted due to inclement weather conditions. Both bald and golden eagles have been detected during winter counts.

Landbird information was collected during surveys for willow flycatcher as well as surveys conducted in upland sites. Willow flycatcher surveys were conducted in 1993, 1994, 2004, 2005, and 2013. No willow flycatchers were detected during these surveys. The Pacific Southwest Region removed the Modoc as potential willow flycatcher habitat during the last sensitive species list revision based on the results of forest-wide surveys (only sporadic willow flycatcher sightings have occurred over the past 20 years). Point Counts based on methods of Ralph et al (1995) were conducted within the analysis area in 2012 for landbirds. See Appendix A of the landbird report for a list of the landbirds considered as *Birds of Concern* (by the USFWS) detected during these surveys.

Surveys conducted by our partners have included the following species. Mule deer and pronghorn antelope surveys have been conducted annually to determine population trends throughout Modoc County by the California Department of Fish and Wildlife.

3.13.3.3 Affected Environment for Species Carrying Forward in this Analysis

Landbird

The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by Executive Order 13186 in 2001, in addition to the Partners in Flight (PIF) specific habitat conservation plans for birds, and finally the January 2004 PIF North American Landbird Conservation Plan all reference goals and objectives for integrating bird conservation into forest management and planning.

In late 2008, a Memorandum of Understanding between the USDA Forest Service and the US Fish and Wildlife Service to Promote the Conservation of Migratory Birds (MOU) was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the Forest Service and the Fish and Wildlife Service as well as other federal, state, tribal and local governments. Within the National Forests, conservation of migratory birds should focus on providing a diversity of habitat conditions at multiple spatial scales, while ensuring that bird conservation is addressed when planning for land management activities.

The U.S. Fish and Wildlife Service (USFWS) has compiled lists of birds to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973." These birds are listed in the *Birds of Conservation Concern 2008* (USFWS, 2008). The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities. The list of the Birds of Concern for the Project Areas is in Appendix A of the Landbird Report. There are a variety of habitats represented by the species listed in Appendix A of that document. However, only those reliant on woody and herbaceous riparian plants, grasslands, sage-steppe would be affected by the actions proposed within the South Warner Grazing EA.

Bald Eagle

There are two nesting pairs of bald eagles within the analysis area, a third pair about one mile east of Parsnip Allotment, and a fourth pair on the Forest Service/private land boundary in the southwestern corner of the analysis area. Neither pair within the analysis area produced young in 2013; however, the third and fourth pairs each fledged one young.

Disturbance from management activities to nesting birds is of primary concern. Limited Operating Periods are routinely used to ameliorate effects from activities, which can cause birds to abandon their nests.

Suitable habitat for bald eagles includes large trees for perching and nesting near lakes and larger rivers, which serve as foraging areas. On the Warner Mountain Ranger District, several pairs nest along perennial creeks. However, many of these nest sites are within a few miles of a larger body of water like Blue or Goose Lakes.

Key Indicators for Effects Analysis Include: Potential for disturbance of nests and sedimentation in creeks (which could degrade fish habitat).

Current Condition of the Habitat Factors in the Analysis Area: There are approximately 100 acres of potential nesting habitat within the three allotments. The majority of the banks along Parsnip Creek and the South Fork of the Pit River have continuous vegetation; there does not appear to be a problem with sedimentation, caused by over utilization of riparian vegetation, impacting fish.

Greater Sage-Grouse

Greater sage-grouse were historically plentiful in sage-steppe habitats within Modoc County. The breeding population of greater sage-grouse in Modoc County has had a precipitous downward trend since the 1970's. Except for the translocated birds in the Clear Lake area and grouse near Hayden Hill, no sage-grouse have been observed lekking on the Modoc National Forest, since the 1980's. There were no historic leks within the three allotments.

There are 4,830 acres of low sage and 3,037 acres of sagebrush within the three allotments. Juniper encroachment into the allotment has isolated the patches of potential habitat and limited the value of these patches for sage-grouse nesting, due to the proximity of junipers available as perches to avian predators of sage-grouse. Therefore, potentially suitable sage-grouse nesting habitat is limited.

The sagebrush habitat between the northwest corner of the analysis area and the closest historic lek on the Tablelands has a significant juniper component, which lessens the potential of birds to disperse onto the Modoc National Forest.

Sage-grouse are dependent on sagebrush (*Artemisia* spp.) for both food and cover. As vegetation in upland sagebrush stands dries seasonally, hens move to moister sites (e.g. wet meadows) and to sagebrush grasslands to summer and rear brood. Productive nesting habitat includes sagebrush with horizontal and vertical structural diversity, including sagebrush generally 30-80 cm tall with a canopy of 15-25% and an understory composed of native grasses and forbs (Connelly et al. 2000). Sage-grouse also require open areas to be used as leks during late winter and spring for courtship purposes (Connelly et al. 2000).

Key indicators for effects analysis include the potential for disturbance of nests and young broods, height of grasses during the nesting season, and changes in the amount of forbs.

Sagebrush Habitat for Greater Sage Grouse

The greater sage-grouse was selected as the MIS for sagebrush habitat on the Inyo National Forest and Modoc National Forest. Therefore, this analysis is focused on the effects of this project on sagebrush habitat [CWHR types of sagebrush (SGB) and low sage (SLG)]. Sage-grouse is dependent on sagebrush (*Artemisia* spp.) for both food and cover.

There are currently 919,250 acres of sagebrush habitat on National Forest System lands in the Sierra Nevada. The quality and quantity of sagebrush habitat have declined for at

least the last 50 years throughout the range of the greater sage-grouse. Over the last two decades in the Sierra Nevada, the habitat quantity trend is essentially stable (remaining at 8% of the acres on National Forest System lands).

There are 4,830 acres of low sage and 3,037 acres of sagebrush within the three allotments. Although stated in the Outlet section, these statements from NRCS studies concerning the analysis area (Jackson Draft) sum up the condition in many sagebrush stands within the three allotments. "Juniper encroachment was also thought to be responsible for a reduction of understory components in the mountain sage and low sage types. Where juniper invasion was advanced, shrubs had generally been eliminated from the plant community, bare ground was higher than expected for the sites, and cheatgrass was abundant."

Current data from California and the Sierra Nevada indicate that, although habitat quantity and quality has decreased historically, the current habitat trend for greater sage-grouse in the Sierra Nevada is stable. However, current and future threats to the habitat have been identified and the greater sage-grouse and the Bi-State sage-grouse distinct population segment are now Candidate species under the Federal Endangered Species Act (USFWS 2010).

Although South Warner Mountain Grazing Project could cause localized increases in sagebrush habitat (0.18 percent) on the Modoc National Forest, implementation of the three action alternatives would not alter the existing trend of sagebrush within Sierra Nevada Bioregion.

As vegetation in upland sagebrush habitats desiccate, hens move to more mesic sites, such as riparian, wet meadows, and sagebrush grasslands, to summer and rear broods. Productive nesting habitat includes sagebrush with horizontal and vertical structural diversity, including sagebrush generally 30-80cm tall with a canopy of 15-25% and an understory composed of native grasses and forbs. The effects of this project on other habitats used by sage-grouse as well as potential effects to individuals are discussed in the South Warner Mountain Grazing Analysis Project Terrestrial Biological Evaluation.

Habitat Factor(s) for the Analysis:

1) Acres of sagebrush habitat (CWHR types SGB and LSG).
2) Acres with changes in shrub ground cover class (Sparse=10-24%; Open=25-39%; Moderate=40-59%; Dense=60-100%).
3) Acres with changes in shrub size class [Seedling shrub (seedlings or sprouts <3years); Young shrub (no crown decadence); Mature Shrub (crown decadence 1-25%); Decadent shrub (>25%)].
4) Changes in perennial herbaceous understory.

Yellow Warbler (Riparian Habitat)

The yellow warbler was selected as the MIS for riparian habitat in the Sierra Nevada. This species is usually found in riparian deciduous habitats in summer (cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland) (CDFG 2005). Yellow warbler is dependent on both meadow and non-meadow riparian habitat in the Sierra Nevada (Siegel and DeSante 1999).

The Montane Riparian (MRI) habitat is found exclusively along the South Fork of the Pit River and West Valley Creek within the analysis area. The Range Report stated the following, "Woody riparian species, such as willow, were well-represented by multiple age classes and did not shows signs of hedging which would indicate a history of excessive browse (Jackson Draft)."

Monitoring of the yellow warbler across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes mountain quail, hairy woodpecker, and fox sparrow (USDA Forest Service, 2010).

Yellow warblers were detected on 13.7% of 160 riparian point counts in 2009 and 19.4% of 397 riparian point counts in 2010; additional detections were documented on upland point counts. The average abundance (number of individuals recorded on riparian passive point count surveys) was 0.166 in 2009 and 0.309 in 2010. In addition, the yellow warblers continue to be monitored and surveyed in the Sierra Nevada at various sample locations by avian point count, spot mapping, mist-net, and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008). Current data at the range-wide, California, and Sierra Nevada scales indicate that the distribution of yellow warbler populations in the Sierra Nevada is stable.

The twenty-five acres within the three allotments do not appear to be impacted by livestock grazing or any other foreseeable management activities. Therefore, there would no change in the amount of MRI habitat forest-wide or within the Sierra Nevada bioregion.

Habitat Factor(s) for the Analysis:

1) Acres of riparian habitat (CWHR montane riparian (MRI) and valley foothill riparian (VRI)).
2) Acres with changes in deciduous canopy cover.
3) Acres with changes in total canopy cover.
4) Acres with changes in CWHR size class.

Pacific tree frog (wet meadow habitat)

The Pacific tree frog (now known as the Pacific chorus frog) was selected as an MIS for wet meadow habitat in the Sierra Nevada. This broadly distributed species requires

standing water for breeding; tadpoles require standing water for periods long enough to complete aquatic development, which can be as long as 3 or more months at high elevations in the Sierra Nevada. During the day throughout the breeding season, adults take cover under clumps of vegetation and surface objects near water; the remainder of the year, they leave their breeding sites and seek cover in moist niches in buildings, wells, rotting logs or burrows.

Since 2002, the Pacific tree (chorus) frog has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2006, 2007b, 2009, 2010; Brown 2008). These data indicate that Pacific tree (chorus) frog continues to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of Pacific tree (chorus) frog populations in the Sierra Nevada is stable.

A 0.02 percent change in the height of meadow vegetation on a forest-wide basis would not alter the existing trend in habitat either on the Modoc National Forest or within the Sierra Nevada bioregion, nor will it lead to a change in the distribution of Pacific tree frogs across the Sierra Nevada bioregion.

Breeding and egg-laying occurs from November until July, depending on the location. Tadpoles are sensitive to nitrites and excess nitrite concentrations from agricultural runoff, which could cause them harm[9]. Breeding sites are used only a few weeks or months of the year. Tree frogs spend the rest of the year in surrounding upland areas. In fact, it is not uncommon to find tree frogs several hundred yards from water.[10]

WTM habitat was only typed in three locations within the analysis area: 1) adjacent to Jess Valley on the West Warner Road, 2) next to the Jess Valley bridge, and 3) in the southwestern region of the analysis area (See the small black polygons on the map in Appendix 1). Field reviews were made at each of the areas.

The area next Jess Valley on the forest boundary is an extension of the meadow habitat found within Jess Valley; although there are meadow plants present, the area was dry in early July 2013. The second area, near Jess Valley Bridge, flanks the South Fork of the Pit River. The last area lies on both sides of a creek, which was dry on 29 July 2013. Although this meadow did not continue to the Forest corner (Section 3) as depicted in the vegetation data, the size (three acres) from the CWHR data was used as a conservative assessment for the effects analysis.

The following information concerning wet meadows comes from Mr. Jackson's range report (Jackson Draft). Wet meadow habitat within the allotment exhibited vigorous plant communities with expected distributions of appropriate functional/structural groups. Vegetation was dominated by native perennial grasses such as meadow barley (*Hordeum branchyantherum*), meadow foxtail (*Alopecurus pratensis*), mountain brome (*Bromus carinatus*), Canada wild rye (*Elymus Canadensis*) and bottlebrush squirreltail. Non-native

[9] http://www.californiaherps.com/frogs/pages/p.regilla.html
[10] http://www.dfw.state.or.us/species/amphibians/docs/LWW_Pacific_Treefrog_final.pdf

perennial grasses were also present, commonly represented by Kentucky bluegrass, with sporadic occurrences of intermediate wheatgrass (*Thinopyrum intermedium*), and bulbous bluegrass (*Poa bulbosa*). Invasive species such as bull thistle were noted in meadow habitat, but not in large numbers, and cheatgrass appeared confined to pockets of disturbed areas on meadow fringes. Litter formed 35% of the remaining ground cover while bare soil represented 16%. No signs of accelerated erosion or runoff were observed and site stability was within expected parameters.

Habitat Factor(s) for the Analysis:

(1) Acres of wet meadow habitat [CWHR wet meadow (WTM) and freshwater emergent wetland (FEW)].
(2) Acres with changes in CWHR herbaceous height classes [short herb (<12"), tall herb (>12")]. (3) Acres with changes in CWHR herbaceous ground cover classes.
(3) Changes in meadow hydrology.

3.13.4 Environmental Consequences

The outline of this section is as the following:

3.13.4.1 Alternative 1
Direct and Indirect Effects
Cumulative Effects
3.13.4.2 Alternative 2
Direct and Indirect Effects
Cumulative Effects
3.13.4.3 Alternative 3
Direct and Indirect Effects
Cumulative Effects
3.13.4.4 Alternative 4
Direct and Indirect Effects
Cumulative Effects
3.13.4.5 Alternative 5
Direct and Indirect Effects
Cumulative Effects

Under each effects section, a list of species is analyzed:

- Land bird
- Bald Eagle (FS Sensitive Species)
- Greater Sage Grouse (MIS and FS Sensitive Species)
- Sagebrush Habitat for Greater Sage Grouse
- Western Bumble Bee (FS Sensitive Species)
- Yellow Garbler (MIS)
- Wet Meadow Frog (MIS)
- Mule Deer (Modoc NF LRMP Wildlife Species)

3.13.4.1 Alternative 1
Direct and Indirect Effects
Landbird

Montane riparian vegetation would be unaltered by grazing, thereby benefitting landbirds dependent on riparian deciduous vegetation.

There would be no enhancement of habitat for species requiring sage-steppe and open habitats; the analysis area would continue to decline in suitability for species dependent on sagebrush and grasslands. Rosenstock and Van Riper III (2001) found that, "A density of [greater than or equal to] 10 juniper trees per ha is the approximate threshold at which habitat suitability for grassland species declines and at which restoration treatments should be considered."

There would be no change in the amount or quality of eastside pine, mixed conifer, or snag habitat.

Bald eagle (Forest Service Sensitive Species)

There would be no chance of disturbance to nesting bald eagles. Riparian vegetation would be unaltered by grazing, so there would be no potential sediments in creeks caused by livestock.

Greater sage-grouse

There would be no chance of disturbance to sage-grouse. Riparian vegetation would be unaltered by grazing thereby increasing its potential as sage-grouse habitat. However, the unsuitability of the area to serve as sage-grouse habitat outweighs any improvements in riparian habitat. There would be no enhancement of sage-steppe and open habitats under this alternative.

Sagebrush Habitat for Greater Sage Grouse

There would be no change in the amount of sagebrush in the three allotments under this alternative. It is anticipated there would be an increase in the amount of cover and the height of grasses and forbs. However, there would be no potential increases in sagebrush habitat from decreases in juniper.

Western Bumble Bee

No Grazing is synonymous with "No Action" and means that livestock grazing would not be authorized within the project area. Livestock grazing permits would be cancelled in accordance with agency regulations (36 CFR 222.4) and grazing would cease two years after notice of cancellation (FSH 2209.13, 16.24). Allotment management would not change during this two year period from the current management.

All structural range improvements currently in place for control or management of livestock would be removed such as fences and water developments. Juniper removal would not take place on any of the three allotments under this alternative.

Potential beneficial impacts to the western bumble bee habitat of alternative 1 would include no reduction in floral resources due to cattle grazing, (after 2 years). Also, no cattle trampling impacts to rodent burrows and disturbance of grass clumps which are potential nest sites for western bumble bees (after 2 years).

Potential negative impacts to western bumble bee habitat would include:

- No removal of western junipers which compete with flowering plants for water, sunlight and nutrients. (Flowering plants provide food supplies for bumble bees.)
- Duff and needle cast would continue unabated, thus degrading seedbeds for many flowering plants.
- Also, the removal of water developments for livestock would reduce water sources for bumble bees and other wildlife.

Yellow Warbler (Riparian Habitat)

Riparian vegetation would be unaltered by grazing, thereby benefitting species dependent on riparian deciduous vegetation such as yellow warbler.

Pacific tree frog (wet meadow habitat)

Riparian vegetation would be unaltered by grazing, thereby benefitting species dependent on wet meadow vegetation.

Mule deer (Modoc LRMP Wildlife Species)

Potential beneficial effects for mule deer include:

- Elimination of competition with cattle for forage and spatial resources, and
- Removal of fences (if funds become available). These potential benefits would occur 2 years after adoption, if this alternative was selected.
- Potential negative effects of this proposal include:
- Removal of water developments for livestock, which are also used by deer and other wildlife,
- Western junipers (lacking old growth characteristics) would not be removed on 1,364 acres of the project area, thus allowing junipers to suppress the growth of important food plants for deer in the understory on these acres,
- Junipers lacking old growth characteristics would not be felled on 282 acres along the south fork of the Pit River, unnamed stream in the West Valley allotment and along

Little Parsnip Creek for use as barriers to cattle trailing along streams. This lack of action would allow watershed damage from trailing cattle to continue and also would allow junipers to suppress the growth of understory plant which provide food for deer.

Cumulative Effect

For landbird, Bald eagle, Greater sage-grouse Sagebrush Habitat for Greater Sage Grouse, Western Bumble Bee, Yellow Warbler (Riparian Habitat), and Pacific tree frog (wet meadow habitat), there would be no cumulative effects associated with the No Action Alternative.

Mule deer (Modoc LRMP Wildlife Species)

Most of the surrounding public and private lands are grazed by livestock; therefore the greatest potential effect of this alternative would be to reduce the percentage of lands impacted by livestock. This result may have a minor to moderate positive impact on mule deer on and near the project area, due to reduced competition with cattle. However, the lack of a mechanism to reduce juniper encroachment in this alternative would allow degradation of mule deer habitat to continue, and thus would limit its overall effectiveness. As a result, no significant cumulative effect would be expected as a result of implementing this alternative.

3.13.4.2 Alternative 2

Direct and Indirect Effects

Landbird

The reduction in numbers would facilitate grazing levels per the Modoc National Forest LRMP (U.S. Forest Service, 1991). Grazing standards, when adhered to, are effective for maintaining and restoring upland and riparian function based on the results of long-term monitoring.

The uplands appear to have few impacts from livestock grazing based on plant condition. Consequently, grazing should have little effect to landbirds dependent on upland vegetation in sage-steppe, juniper and pine forests. Moser and Witmer (2000) found no changes in bird abundance and species richness between grazed and ungrazed sites in *Pinus ponderosa/Symphoricarpos albus* vegetation sites in northeastern Oregon.

Based on field reconnaissance by Jackson (Draft) and myself, woody montane riparian vegetation has been largely unaltered by livestock grazing as evidenced by the forms (e.g. willows that did not have mushroomed shapes) and the number of age classes found within this vegetation type. This vegetation type is especially important to many riparian dependent birds found on the forest.

The creation of livestock barriers and the fencing of the fen are expected to aide in maintaining herbaceous riparian vegetative structure in the allotments.

The decrease in juniper is expected to cause a corresponding increase of sagebrush, grasses, and forbs. Species dependent on sage-steppe and grasslands for nesting could

benefit from the reduction in juniper cover. Various authors noted declines in grassland and sagebrush species with increasing amounts of juniper. Currently, there are 2 acres of grasslands, 629 acres of sage-steppe (LSG and SGB), and 732 acres of juniper woodlands within the area proposed for juniper treatments. There would be a net increase of 1,364 acres in grasslands and sagebrush stands (the differences in the acres between the table and the proposed action are due to rounding). These changes are anticipated to increase habitat for sage and Brewer's sparrows, which are on the Birds of Conservation List (Appendix A of the Landbird Report).

Post-project there would still be 5,552 acres of juniper woodlands. These woodlands provide nesting opportunities for mountain bluebirds, northern flickers, and various flycatchers. Reinkensmeyer et al (2007) suggested that management strategies should restore or maintain the desired proportions of different successional states to maintain populations of grassland and sagebrush birds, while providing habitat for tree and cavity nesting species.

Reinkensmeyer et al (2008) found that there was a change in bird species composition during winter and early spring in grasslands, sage-steppe, and juniper woodlands. They also noted that the increase in pinyon and juniper woodlands (with the corresponding decline in grassland and sage-steppe communities) has resulted in a decline in landscape heterogeneity. They recommended managing for a broad range of successional stages in order to maintain habitat for a variety of landbird species throughout the seasons.

Wiens and Rotenberry (1985) noted there might not be evidence of an immediate change in bird populations to habitat changes in grasslands and sagebrush. They cautioned several years of study might be needed to determine the magnitude and presence of treatment effects.

Species dependent on eastside pine, mixed conifer, or snag habitat are expected to be unaffected by livestock grazing, riparian improvements, or juniper felling.

Bald eagle (Forest Service Sensitive Species)

Disturbance related to livestock management is not anticipated to be a problem due to the location of the nests. West Valley Creek is gated and access is mostly limited to the water master and maintenance crews for the dam. The Parsnip Creek nest is located mid-slope of a steep hillside. Livestock are not turned out at these locations early in the spring. Later into the nesting period, livestock use is discouraged by the amount of downed logs and brush in addition to the slope.

Figure 3 in the BE shows a typical stretch of the creek from West Valley Dam to the South Fork of the Pit River. Both herbaceous and woody riparian vegetation are fairly continuous along the creek. The rocky and steep nature of the slope appears to have discouraged livestock use of this creek as well.

Greater sage-grouse

It is highly unlikely that livestock grazing could disturb sage-grouse within the analysis area. Due to the lack of birds in the analysis area and the adjacent BLM lands as well as the poor condition of the analysis area to provide habitat (i.e. numerous predator perches, inconsistent grass forb cover), it is not expected that grazing would affect sage-grouse.

Livestock grazing is not expected to cause a direct competition to sage-grouse. Dietary preferences of cattle do not usually strongly overlap with those of sage-grouse, since they are primarily grass rather than forb/shrub feeder. However, grazing can cause decreases in grass and forb cover important for nesting sage-grouse and for brood rearing. According to Miller and Eddleman (2001) (in Horney 2008), poorly managed grazing can lead to changes in the proportion of the shrub, grass, and forb structural groups, increase opportunities for invasive annuals, shorten the growing season, and can eventually reduce site potential if topsoil erosion is accelerated. Over time, sites in declining condition often lose their capacity to capture, store and release water, which can shorten the growing season and shift plant communities to different vegetation types. The three allotments have very limited potential to serve as sage-grouse habitat, due to the amount of dense juniper cover, therefore livestock associated decreases in understory grass and forb cover are not expected to cause declines to sage-grouse habitat for the Modoc National Forest .

Felling juniper trees to act as barriers to livestock movement could enhance understory grass and forb cover. However, the overall lack of suitable habitat within the three allotments renders these improvements minor with respect to sage-grouse.

The removal of encroaching junipers from potential sage-grouse habitat could enhance potential sage-grouse habitat depending on the amount of overstory juniper trees left in the area. However, an increase in the amount of introduced annual grasses could negate any potential gains in sage-grouse habitat.

Sagebrush Habitat for Greater Sage Grouse

Livestock grazing is not expected to change the amount of sagebrush within the analysis area. Livestock eat primarily grass, rather than forb or shrubs. However, grazing can cause decreases in grass and forb cover important for sagebrush dependent species like sage-grouse.

Livestock utilization in the uplands ranged from light to moderate in the Outlet and West Valley Allotments; there was incidental use within the Parsnip Allotment near livestock trails (Jackson Draft). Based on a review of the herbaceous vegetation on the western boundary of the Forest conducted on 29 July 2013, there was no utilization of upland herbaceous vegetation from the private land parcel west of West Valley Spring to the dry creek south of the perennial branch of Parsnip Creek (Figure 1 of the terrestrial MIS report).

Mr. Jackson noted the following in the West Valley Allotment, “All herbaceous plants in the allotment, including natives, were vigorous and reproducing but uplands remain

susceptible to widespread juniper encroachment." In the Outlet Allotment, "Seed heads were abundant on all grass and graminoid species." His summation of the whole analysis area is as follows, "Instead, incidents of grazing related effects appear to have been relatively localized, occurring at a small number of locations – usually near water. In contrast, large acreages appear to be receiving appropriate or even relatively low amounts of grazing use." Based on observation by Forest staff, the NRCS, and those of Mr. Jackson, livestock associated decreases in upland perennial herbaceous understory appear to have little effect on sagebrush habitats within the analysis area.

The removal of encroaching junipers from sagebrush habitat could enhance potential sagebrush habitat depending on the amount of overstory juniper trees left in the area.

Western Bumble Bee

Potential negative impacts to western bumble bee habitat of Alternative 2 would include:

- continued cattle grazing which may lead to reductions in floral resources, but reduction of cattle use of West Valley Allotment would lessen this potential impact,
- trampling of rodent burrows and disturbance of grass clumps (potential bumble bee nest sites) by cattle - reducing cattle grazing on West Valley Allotment would lessen this potential impact,
- damaging floral resources during felling, piling and burning of western junipers.

Potential beneficial impacts to western bumble bee habitat of this alternative would include:

- release of nutrients as a result of pile burning may increase floral resources adjacent to pile burns,
- greater availability of floral resources on 1,646 acres where junipers would be subject to removal, due to increased availability of sunlight, water and nutrients to flowering plants and better seedbeds due to reduced accumulations of duff on soil surfaces,
- fewer potential impacts of cattle grazing and trampling on West Valley Allotment due to reduction in cattle use,
- retention of water developments which provide important water sources for bumble bees and other wildlife.

Yellow Warbler (Riparian Habitat)

There was very little use of MRI by livestock noted. This is due in part to steep, rocky banks, which inhibit livestock movement along the South Fork of the Pit River and West Valley Creek. Juniper barriers could deflect livestock use near the Jess Valley bridge, where some use of willow was detected. However, overall grazing does not appear to be affecting MRI habitat. Sage-steppe restoration is not proposed near any of the MRI habitat and would consequently have no effect on acres, canopy cover, or age class distribution of MRI.

Pacific tree frog (wet meadow habitat)

Livestock utilization and trampling have affected the height of wet meadow vegetation at both meadow sites in the Outlet Allotment (Figures 3 and 4 in the terrestrial MIS report). However, there was no grazing evident on the three acre wet meadow site in the Parsnip Allotment located in the southwestern corner of the analysis area (Figure 5 in the terrestrial MIS report). Currently, the Parsnip Allotment is used primarily for trailing between the West Valley and the Blue Lake Cattle and Horse Allotments. Most of the livestock use is concentrated in the upper portion of the allotment and along Little Parsnip Creek. If livestock use patterns in the Parsnip Allotment change, all 5.8 acres of wet meadow habitat within the entire analysis area could be affected by livestock grazing depending on the amount of herbivory at any given location.

Although the 2.8 acres of habitat encompassed in both of these meadow sites have had changes in the height of vegetation, there does not appear to be changes in the acreage, ground cover, or meadow hydrology at either area. In a study of Sierra Nevada meadows, Purdy and Moyle (2007) stated the single biggest factor that reduces meadow resiliency and hence promotes degradation in the Sierra Nevada is grazing, particularly in the way it can change meadow hydrology. There was no indication of changes in hydrology in the Outlet Allotment (Jackson Draft).

In a large scale study of Sierran meadows (including data from the Warner Mountain Ranger District), Purdy and Moyle (2007) found that the majority of the meadows studied (71 percent) were in fair condition. Overall scores for meadows in the southern portion of the Warner Mountain Ranger District ranged from 50 to 57 (which would be rated as marginal); however, the habitat index ranged from 59 to 82, which would categorize three out of the four meadows as fair (the values in the fair category are 61 to 80). Although the meadows in the dataset were not within the analysis area, they represent the condition of the three wet meadow parcels found in the Outlet, Parsnip, and West Valley Allotments.

The reduction in numbers proposed in this Alternative could facilitate grazing levels per Modoc LRMP standards as amended by the Sierra Nevada Framework (USDA Forest Service 2004). These grazing standards, when adhered to, maintain and restore riparian function. Proposed herbaceous understory utilization standards range from 35% at various locations in the Parsnip Allotment to 50% throughout most of the rest of the three allotments; the South Fork of the Pit River allows 55% utilization (A. Cuzick, pers. comm.).

With respect to amphibians specifically, it is anticipated that tree frog and wet meadow dependent species habitat would still be present in the midst of livestock grazing based on information found in the following three studies. Research concerning Sierra Nevada meadow systems in relation to Yosemite Toad habitat stated that current grazing guidelines did not cause impairment to habitat based on pool condition and toad response. In a secondary study, Roche et al. (2012b) noted that the lack of direct impact to toads from grazing could be attributed to "… 1) for the majority of the grazing season, the two species mostly occupy differing zones along the moisture gradient, resulting in physical

portioning of the meadow habitat and minimizing any direct or indirect negative impacts; 2) when there is habitat use overlap (e.g., during the early part of the grazing season) grazing levels are low to moderate, resulting in no detectable impacts on toad occupancy. The grazing guidelines in both Roche et al studies are similar to those proposed in the South Warner Grazing EA.

A third study conducted in northeastern Oregon on Columbia spotted frog found the following, "Neither the number of recently metamorphosed frogs nor the ratio of recently metamorphosed frogs to number of egg masses was significantly different between the 25 grazed and 29 ungrazed sites (Table 1 [of their paper]). There were also no significant differences between grazed and ungrazed sites in water characteristics (dissolved oxygen, nitrates, pH, and conductivity). However, correlation analysis revealed that numbers of recently metamorphosed frogs were inversely correlated with the presence of fishes (Spearman's Rank, $r = -0.41$, $p = 0.0028$) for all sites." (Bull and Hayes 2000). Bull and Hayes concluded, "These data [from the study on the whole] failed to reveal that grazing had a negative effect on reproduction and recruitment of the Columbia spotted frog in northeastern Oregon." It should be noted that the spotted frog study was conducted on both public and private lands, so grazing intensities could have been higher than those proposed within the South Warner EA.

The creation of livestock barriers and the fencing of the fen could aide in maintaining riparian vegetative structure. The two acres of meadow habitat near the Jess Valley Bridge could especially benefit from this treatment.

Sage steppe treatments would have no effect on wet meadow habitat, due to the distance of these proposed treatments in relation to the location of the wet meadow habitat within the analysis area.

Mule deer (Modoc LRMP Wildlife Species)

Potential beneficial effects for mule deer include:

- release of understory food plants on 1,364 acres of the study area through the removal of western juniper trees, which lack old growth characteristics,
- reduction in permitted levels of cattle grazing on the West Valley Allotment, and
- retention of water developments for cattle, which are also used by deer and other wildlife,
- junipers lacking old growth characteristics would be felled on 282 acres along the south fork of the Pit River and along Little Parsnip Creek for use as barriers to cattle trailing along streams. This action would help prevent watershed damage from trailing cattle and also would also reduce competition from juniper for sunlight, water and nutrients needed by understory plants which provide forage for deer.

Potential negative impacts of this alternative include:

- renewal of grazing permits on the study area (permitted levels of grazing would be reduced on West Valley Allotment), which would allow competition with cattle for forage and space to continue, and
- retention of fences, which may constitute barriers and hazards to deer.

Cumulative Effects

Bald eagle (Forest Service Sensitive Species)

Past and present activities affecting the three allotments include: grazing by cattle, timber harvest, fuel-wood gathering, dispersed recreation, suppression of wildfires, activities under special use permits, human development, and invasive plant management. The cumulative effects analysis area includes the Outlet, West Valley and Parsnip Allotments. The timeframe for cumulative effects analysis is 2013 to 2023.

Livestock grazing does not appear to have caused sedimentation issues in occupied and potential habitat due to multiple factors including slope (see discussion above); unless the livestock use patterns change, there are no effects expected by continued grazing. Therefore, future grazing is not expected to cause cumulative effects to the bald eagle or its habitat within the analysis area.

Timber harvest has occurred in the areas west of Blue Lake Ranch in the Upper portion of Parsnip Creek: Parsnip Basin Salvage (Commercial Thin and Sanitation in 1997 and 1998), Parsnip Basin Salvage in 2000, and Blue Fire Forest Recovery Project (Fire Salvage in 2005 and 2006). Bald eagle management was a key part of these sales; the US Fish and Wildlife Service was consulted throughout all of these planning processes. Therefore, timber harvest caused no cumulative effects to the bald eagle or its habitat.

Juniper reduction to enhance sage-steppe habitat has occurred on both private land adjacent to and within the analysis area; two USFS projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and the Outlet/West Valley Mechanical Juniper Thinning Project (in 2005). Woodcutters were observed taking materials left after the completion of the USFS juniper reduction projects. None of these activities occurred in occupied or potential nesting bald eagle habitat. Juniper trees are not anticipated to serve as bald eagle nesting habitat. In addition, the nests are not near the treatment areas, so there is no chance of disturbance. Therefore, the juniper treatments have had no cumulative effects to bald eagle or its habitat.

Dispersed recreation is focused on the South Fork of the Pit River; however, fly fishermen have been seen upstream from the Parsnip Creek nest. Although recreationists could disturb nesting birds, grazing would not add to this effect.

Fire suppression, noxious weed treatments, road maintenance, development on private lands, and most of the activities under Special Use Permits are not expected to affect the bald eagle or its habitat. However, activities occurring along West Valley Creek (dam maintenance which uses the road that flanks West Valley Creek) could disturb that pair. However, there would be no cumulative effect from grazing from these various activities.

To summarize, there are no cumulative effects anticipated due to grazing as described under Alternative 2, although individual activities could disturb the eagles.

Greater sage-grouse

Past and present activities affecting the three allotments include: grazing by cattle, timber harvest, fuelwood gathering, dispersed recreation, suppression of wildfires, activities under special use permits, human development, and invasive plant management. The cumulative effects analysis area includes the Tablelands, Jess Valley, and the Parsnip, Outlet, and West Valley Allotments. The timeframe for cumulative effects analysis is 2013 to 2023.

Livestock grazing has been occurring in Modoc County on both public and private lands for more than a century. Grazing is expected to continue into the next decade. The type conversions of suitable sage-grouse habitat to annual exotic grasses on the Tablelands (due to wild fire) have been attributed to the decline of sage-grouse in this area. Without a nearby source population for sage-grouse to migrate onto the Forest coupled with the condition of the habitat on the Forest, grazing is not expected to affect potential sage-grouse occupancy within the USFS three allotments.

Timber harvest has occurred in the areas west of Blue Lake Ranch in the Upper portion of Parsnip Creek: 1) 1997 and 1998 Parsnip Basin Salvage (Commercial Thin, Sanitation) and 2) 2005 and 2006 Blue Fire Forest Recovery Project (Fire Salvage). This area consists of eastside pine and mixed conifer stands and would not be considered as potential sage-grouse habitat. Therefore, timber harvest is not expected to have any cumulative effects to potential sage-grouse habitat.

Juniper reduction to enhance sage-steppe habitat has occurred on both private and public lands. The juniper treatments occurring on the western flank of Jess Valley are not anticipated to serve as sage-grouse habitat. Therefore, there would be no effect to sage-grouse by juniper treatments on private lands near Jess Valley.

Two projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and the Outlet/West Valley Mechanical Juniper Thinning Project (in 2005). The mechanical thinning project also included the private land parcel west of West Valley Spring. There were roughly 239 acres of juniper reduction between these two projects on the project area. Although native grass, forb, and shrub species are currently present in the units, there is a significant increase in cheat grass cover in the treatment units, where large equipment was used. Treatment in the handfelling areas left both significant amounts of slash and juniper trees (which can be predator perches). Therefore, the juniper treatments would be considered as minor improvements in potential sage-grouse habitat.

Fuel-wood gathering could occur within the three allotments adjacent to transportation systems. These activities could be concentrated in areas where juniper felling has occurred in the past. Fuelwood gathering can decrease the amount of larger fuels in the area causing a corresponding reduction in fire effects to the sagebrush. Therefore,

fuelwood gathering is not expected to have negative effects to potential sage-grouse habitat.

Dispersed recreation is focused on the South Fork of the Pit River. According to GIS and hard copy files there was no use by sage-grouse of this area. Therefore, recreation is not expected to pose any cumulative effects to potential sage-grouse habitat.

A combination of factors including fire suppression has allowed increased juniper levels in the three allotments. Consequently, there is a decrease in the area to serve as sage-grouse habitat. Therefore, fire suppression has had negative effects on potential sage-grouse habitat.

Invasive plants may be treated with either herbicide or hand grubbing according to the Modoc National Forest Noxious Weed Treatment Project standards and guidelines. Treatments are typically small in size and carefully prescribed to minimize potential impacts. Conversely, the effect of not treating the habitat could cause a significant decrease in the amount of potential food and cover for sage-grouse. Sveum et al. (1998b) documented that exotic plants (cheat grass and knapweed) negatively impacted sage-grouse nesting habitat; they believed that restoring native sagebrush communities would provide better [sage-grouse] habitat. Therefore, there would be beneficial effects to potential sage-grouse with noxious weed treatments.

Road maintenance, development on private lands, and activities under Special Use Permits (Surprise Valley Electric, Opal Mines, and irrigation ditch) are not expected to affect sage-grouse habitat.

To summarize, there are no cumulative effects anticipated with the implementation of Alternative 2.

Sagebrush Habitat for Greater Sage Grouse

Forest-wide acreage of SGB is 280,202 acres and LSG is 475,901 acres. An increase of the 1,364 acres proposed in this analysis would be a change of 0. 18 percent of the forest total.

Past and present activities affecting the three allotments include: fuelwood gathering, dispersed recreation, suppression of wildfires, activities under special use permits, and invasive plant management.

Juniper reduction to enhance sage-steppe habitat has occurred on both private and public lands. The juniper treatments occurring on the western flank of Jess Valley are not anticipated to serve as sage-grouse habitat. Therefore, there would be no effect to sage-grouse by juniper treatments on private lands near Jess Valley; however, the decreases in juniper cover could benefit other sagebrush dependent species.

Two projects occurred within the analysis area: West Valley Hand-felling Juniper Treatment Project (in 2003) and the Outlet/West Valley Mechanical Juniper Thinning Project (in 2005). The mechanical thinning project also included the private land parcel

west of West Valley Spring. There were roughly 239 acres of juniper reduction between these two projects on the project area

Although native grass, forb, and shrub species are currently present in the units, there was a significant increase in cheat grass cover in the treatment units, where large equipment was used. Treatment in the hand-felling areas left both significant amounts of slash and juniper trees (which can be sage-grouse predator perches). By combining the amount of juniper treatments proposed in this analysis with those from the past, there would be 1,603 acres of juniper treatments or a 0.21 percent increase in sagebrush habitat forest-wide.

Fuel-wood gathering adjacent to transportation systems was observed in areas where juniper treatment had occurred. Fuel-wood gathering can decrease the amount of larger fuels in the area causing a corresponding reduction in fire effects to the sagebrush. Therefore, fuel-wood gathering is not expected to have negative effects to potential sagebrush habitat.

Dispersed recreation is focused on the South Fork of the Pit River. Therefore, recreation is not expected to pose any cumulative effects to potential sagebrush habitat.

A combination of factors including fire suppression has allowed increased juniper levels in the three allotments. Consequently, there is a decrease in the area to serve as sagebrush habitat. Therefore, fire suppression has had negative effects on potential sagebrush habitat.

Invasive plants may be treated with either herbicide or hand grubbing according to the Modoc National Forest Noxious Weed Treatment Project standards and guidelines. Treatments are typically small in size and carefully prescribed to minimize potential impacts. Conversely, the effect of not treating the habitat could cause a significant decrease in the amount of potential food and cover for sage-grouse. Sveum et al. (1998) documented that exotic plants (cheat grass and knapweed) negatively impacted sage-grouse nesting habitat; they believed that restoring native sagebrush communities would provide better [sage-grouse] habitat. Therefore, noxious weed treatments would be beneficial to sage-grouse and other species dependent on sagebrush.

Road maintenance and activities under Special Use Permits (Surprise Valley Electric, Opal Mines, and irrigation ditch) are in localized areas and are not expected to affect sagebrush habitat.

To summarize, there are no cumulative effects anticipated with the implementation of Alternative 2.

A total increase of 0.21 percent in sagebrush habitat forest-wide is not expected to have significant effects on habitat trends within the three allotments, on a forest-wide basis, or within the bio-region for Alternative 2.

Western Bumble Bee

The proposed action is unlikely to have cumulative effects on Western bumble bees or their habitat, due to light levels of cattle use (by historical norms) and the relatively rapid recovery ability of understory vegetation.

The area within the South Warner Grazing Analysis Project area is under permit for cattle grazing. As discussed earlier, bumble bees have persisted on the Warner Mountains through periods of much heavier grazing than is currently practiced. And the noted declines in western bumble bee distribution on portions of their historic range occurred many decades after livestock grazing was at its most severe on the Warner Mountains.

Therefore, cattle grazing would have low potential for significant cumulative effects to the western bumble bee.

There is little firewood gathering in the project area due to the distance from town centers. Removing trees for firewood generally releases forbs and shrubs from competition with trees for light, nutrients and water. Bumble bees rely on these understory plants to provide the nectar and pollen on which they depend. Therefore, firewood gathering may benefit western bumble bees. There are no expected negative cumulative effects from firewood cutting on western bumble bees.

Noxious weed treatments could include both physical and chemical treatments of scattered single plants and small weed occurrences. Removing noxious weeds would benefit the native plants in the project area, thereby providing food and cover for western bumble bees from plant species they have evolved with. Therefore, noxious weed treatments should have beneficial cumulative effects to western bumble bee and their habitat.

To summarize, there should be a low potential for cumulative effects to the western bumble bee from implementation of this project considering past, present and foreseeable actions in and adjacent to the South Warner Grazing Analysis Project area.

Bumble bees are generalist foragers (The Xerces Society, 2013). As such, they use a wide variety of floral resources over the course of a growing season. This ability would likely allow them to adapt to changes in floral resources that may take place as a result of climate change.

The western bumble bee was widely distributed across the western United States and Canada (The Xerces Society, 2013). Their ability to survive in a wide variety of climates suggests they would successfully adapt to changes that might occur at nesting and hibernation sites as a result of climate change.

Yellow Warbler (Riparian Habitat)

The total forest acreage of MRI is 1,217, and the acreage on Warner Mountain Ranger District is 930 acres. The twenty-five acres within the three allotments do not appear to be impacted by livestock grazing. Therefore, there would no change in the amount of

MRI habitat on the Warner Mountain Ranger District, forest-wide, or within the Sierra Nevada bioregion.

Past and present activities affecting the three allotments include: grazing by cattle, timber harvest, fuelwood gathering, dispersed recreation, suppression of wildfires, activities under special use permits, human development, and invasive plant management. Although there are other ongoing management activities on Forest System lands such as road maintenance, they do not appear to be causing any cumulative effects to MRI vegetation based on the condition of the MRI stands in the analysis area.

As stated above, the twenty-five acres within the three allotments do not appear to be impacted by livestock grazing or any other foreseeable management activities. Therefore, there would no change in the amount of MRI habitat forest-wide or within the Sierra Nevada bioregion.

Pacific tree frog (wet meadow habitat)

There are 5.8 acres of wet meadow habitat (WTM habitat) within the three allotments; there are 5,571 acres of WTM habitat on the Warner Mountain Ranger District and 13,720 acres of WTM habitat forest-wide. There are 2.8 acres, where livestock have affected the height of vegetation, but no other attributes. This would mean there was a decrease in the height of meadow plants on 0.05 percent on the Warner Mountain RD or 0.02 percent forest-wide basis. When the Modoc National Forest grazing utilization guidelines are applied, it is anticipated that sufficient cover would be left for pacific tree frog based on riparian monitoring data, stubble height specifically.

Purdy and Moyle (2007) summarized meadow condition throughout the Sierra Nevada stating, "Our analysis indicates that there have been profound changes to both the structure and species inhabiting meadow systems in the Sierra Nevada. Nevertheless, we found most of the meadows on public land were in surprisingly good condition, apparently recovering from much heavier use in the past, especially for grazing (Purdy and Moyle 2007). Therefore, it is anticipated that a decrease in the height of meadow plants on 2.8 acres or 0.02 percent forest-wide would not change in the amount of wet meadow habitat forest-wide, nor would it have an appreciable change of the potential WTM habitat in the Sierra Nevada bioregion.

Past and present activities affecting the three allotments include: grazing by cattle, timber harvest, fuelwood gathering, dispersed recreation, suppression of wildfires, activities under special use permits, human development, and invasive plant management. Of all of these activities, only grazing has the potential to affect wet meadow habitat given their locations throughout the analysis area.

The trend data was utilized from Weixelman's (2011) long-term meadow study with 850 permanent plots as a basis line to judge future grazing trends on habitat for wet meadows. This data set includes plots on the Warner Mountain RD; the plots were selected to reflect current management and trend. Weixelman's data indicated that most of the sites had a stable trend, and there were more sites that expressed upward trends than those with

downward trends. Wet meadow types had the highest proportion of plots rated in high condition. If standards are adhered to and livestock use remains consistent with the present levels, then it is anticipated WTM habitat needed by pacific tree frog and other meadow dependent species would be present with future livestock grazing occurring.

Although there are other ongoing management activities on Forest System lands such as road maintenance, they do not appear to be causing any cumulative effects to wet meadow vegetation based on the condition of the WTM stands in the analysis area.

There are 2.8 acres, where livestock have affected the height of vegetation, but no other attributes. This would mean there was a decrease in the height of meadow plants on 0.05 percent on the Warner Mountain RD or 0.02 percent forest-wide basis. Therefore, there would be a discountable change in the amount of wet meadow habitat forest-wide or within the Sierra Nevada bioregion.

Mule deer (Modoc LRMP Wildlife Species)

Western juniper encroachment on and adjacent to the project area has been significant in recent decades. This alternative would reduce juniper on up to 1,646 acres, thus reducing competition from western juniper on important forage plants. While there has been some juniper reduction due to wildfire over the past half century, the general trend is toward increasing juniper on and adjacent to the project area.

Continuation of permitted grazing by cattle over a relatively short grazing season per management standards may have a limited negative impact on mule deer, but would likely be cancelled by the positive effect of releasing the understory vegetation from competition with juniper on up to 1,646 acres. Therefore, a cumulative impact is not expected as a result of implementing this alternative.

3.13.4.3 Alternative 3

Direct and Indirect Effects

Landbird

There could be a difficulty in maintaining grazing levels in riparian areas to Modoc LRMP standards. The creation of livestock barriers and the fencing of the fen are expected to aide in maintaining riparian vegetative structure important to many of the landbirds in the allotments. The decrease in juniper is expected to cause a corresponding increase of sage, grasses, and forbs; species dependent on sage and grasslands are anticipated to benefit from sage steppe restoration. Finally, species dependent on eastside pine, mixed conifer, or snag habitat within these vegetative types are expected to be unaffected by livestock grazing or juniper felling.

Bald eagle (Forest Service Sensitive Species)

The effects of this alternative are similar to Alternative 2 even with the higher number of livestock, due to the low use of riparian areas by livestock within occupied and potential bald eagle habitat.

Greater sage-grouse

The effects of this alternative are similar to Alternative 2 even with the higher number of livestock, due to the low probability of sage-grouse use in the three allotments.

Sagebrush Habitat for Greater Sage Grouse

The effects of this alternative are similar to Alternative 2 even with the higher number of livestock, due to monitoring data indicating the light to moderate use of upland vegetation within the analysis area.

Western Bumble Bee

Potential negative impacts of alternative 3 to western bumble bee habitat would include:

- no reduction in cattle grazing on the project area, which may lead to reductions in floral resources available to bumble bees,
- trampling by cattle of potential bumble bee nest sites in the form of rodent burrows and clumps of grass,
- damage to floral resources during felling, piling and burning of western junipers.

Potential beneficial impacts to western bumble bee habitat would include:

- release of nutrients during pile burning may increase floral resources adjacent to pile sites,
- greater availability of floral resources on 1,646 acres where junipers are subject to removal, due to increased availability of sunlight, water and nutrients to flowering plants, and reduced accumulations of duff on soil surfaces,
- retention of water developments which provide important water sources for bumble bees and other wildlife.

Yellow Warbler (Riparian Habitat)

There could be difficulty in maintaining grazing levels in riparian areas to Modoc LRMP standards with higher livestock numbers. Mr. Jackson's (Jackson Draft) summation of the analysis area is that, "Instead, incidents of grazing related effects appear to have been relatively localized, occurring at a small number of locations-- usually near water." The creation of livestock barriers and the fencing of the fen could aide in maintaining riparian vegetative structure important to species requiring MRI in the allotments, especially near the Jess Valley bridge.

Proposed sage-steppe improvements are expected to have no effect on MRI vegetation, because they are not near MRI stands.

Pacific tree frog (wet meadow habitat)

There could be a difficulty in maintaining grazing levels in riparian areas to Modoc LRMP standards with higher livestock numbers. Mr. Jackson's (Jackson Draft)

summation of the analysis area is that, "Instead, incidents of grazing related effects appear to have been relatively localized, occurring at a small number of locations--usually near water." The creation of livestock barriers and the fencing of the fen could aide in maintaining riparian vegetative structure important to species requiring wet meadow in the allotments, especially near the Jess Valley bridge.

Proposed sage-steppe improvements are expected to have no effect on wet meadow vegetation, because they are not near meadows near proposed sage steppe treatment units.

Mule deer (Modoc LRMP Wildlife Species)

Potential beneficial effects for mule deer include:

- release of understory food plants on 1,364 acres of the study area through the removal of western juniper trees, which lack old growth characteristics, and
- retention of water developments for cattle, which are also used by deer and other wildlife,
- junipers lacking old growth characteristics would be felled on 282 acres along the south fork of the Pit River and along Little Parsnip Creek for use as barriers to cattle trailing along streams. This action would help prevent watershed damage from trailing cattle and also would also reduce competition from juniper for sunlight, water and nutrients needed by understory plants which provide forage for deer.

Potential negative impacts of this alternative include:

- renewal of grazing permits on the study area at current permitted levels of grazing, which would allow competition with cattle for forage and space to continue, and
- retention of fences, which may constitute barriers and hazards to deer.

Cumulative Effects

The cumulative effects associated with this alternative would the same as those discussed under Alternative 2 for Bald eagle, Greater sage-grouse, Sagebrush Habitat for Greater Sage Grouse, Western Bumble Bee ,Yellow Warbler (Riparian Habitat), and Pacific tree frog (wet meadow habitat).

Mule deer (Modoc LRMP Wildlife Species)

Western juniper encroachment on and adjacent to the project area has been significant in recent decades. This alternative would reduce juniper on up to 1,646 acres, thus reducing competition from western juniper on important forage plants. While there has been some juniper reduction due to wildfire over the past half century, the general trend is toward increasing juniper on and adjacent to the project area.

Continuation of permitted grazing by cattle over a relatively short grazing season per management standards may have a limited negative impact on mule deer, but would likely be cancelled by the positive effect of releasing the understory vegetation from

competition with juniper on up to 1,646 acres. Therefore, no negative cumulative impact is expected as a result of implementing this alternative.

3.13.4.4 Alternative 4
Direct and Indirect Effects

Landbird

The effects of this alternative are similar to those covered under Alternative 2, except under alternative 4 there would be no felling of western junipers on 1,364 acres of the West Valley Allotment.

To summarize, the implementation any of the alternatives in the South Warner Grazing Analysis Project should maintain or enhance habitat for the landbirds within the Outlet, Parnsip, and West Valley Allotments, if grazing standards are met and range improvements are completed.

Bald eagle (Forest Service Sensitive Species)

The effects of livestock grazing and riparian habitat improvements would be similar to those discussed under Alternative 2 except for the juniper reduction.

Greater sage-grouse

The effects of livestock grazing and riparian habitat improvements would be similar to those discussed in Alternative 2. However, there would be no enhancement of sage-steppe/potential sage-grouse habitat.

Sagebrush Habitat for Greater Sage Grouse

The potential effects of grazing from this alternative would be similar to Alternative 2. However, there would be no increase in the amount of sagebrush habitat.

Western Bumble Bee

Potential negative impacts to western bumble bee habitat resulting from alternative 4 would include:

- continued cattle grazing which may lead to reductions in floral resources, (reduction of cattle use of West Valley Allotment would lessen this potential impact),
- trampling of rodent burrows and disturbance of grass clumps (potential bumble bee nest sites) by cattle (reducing cattle grazing on West Valley Allotment would lessen this potential impact).

Potential beneficial impacts to western bumble bee habitat of alternative 4 would include:

- greater availability of floral resources on 282 acres where small junipers would be felled and used as barriers to cattle trailing along stream banks, due to increased

availability of sunlight, water and nutrients to flowering plants, and reduced accumulations of duff on soil surfaces,
- Fewer potential impacts of cattle grazing and trampling on West Valley Allotment due to reduction in cattle use,
- Retention of water developments which provide important water sources for bumble bees and other wildlife.

Yellow Warbler (Riparian Habitat)

The potential effects of grazing from this alternative would be the same as Alternative 2. There would be no sage-steppe improvements under this alternative. The retention of juniper would have no effect on MRI habitat.

Pacific tree frog (wet meadow habitat)

The potential effects of grazing from this alternative would be the same as Alternative 2. Although there would be no sage-steppe improvements under this alternative, the retention of juniper would have no effect on wet meadow habitat.

Mule deer (Modoc LRMP Wildlife Species)

Potential beneficial effects for mule deer include:

- retention of water developments for cattle, which are also used by deer and other wildlife,
- Junipers lacking old growth characteristics would be felled on 282 acres along the south fork of the Pit River and along Little Parsnip Creek for use as barriers to cattle trailing along streams. This action would help prevent watershed damage from trailing cattle and also would also reduce competition from juniper for sunlight, water and nutrients needed by understory plants which provide forage for deer.

Potential negative impacts of this alternative include:

- renewal of grazing permits on the study area at current permitted levels of grazing, which would allow competition with cattle for forage and space to continue, and
- retention of fences, which may constitute barriers and hazards to deer.

Cumulative Effect

The cumulative effects associated with this alternative would the same as those discussed under Alternative 2 for Bald eagle, Greater sage-grouse, Sagebrush Habitat for Greater Sage Grouse, Western Bumble Bee, Yellow Warbler (Riparian Habitat) and Pacific tree frog (wet meadow habitat)

Mule deer (Modoc LRMP Wildlife Species)

Western juniper encroachment on and adjacent to the project area has been significant in recent decades. This alternative would reduce juniper on up to 282 acres, thus reducing

the effects of competition from western juniper on important forage plants. While there has been some juniper reduction due to wildfire over the past half century, the general trend is toward increasing juniper on and adjacent to the project area.

Continuation of permitted grazing by cattle over a relatively short grazing season per management standards may have a limited negative impact on mule deer, but would likely be significantly reduced or cancelled by the positive effect of releasing the understory vegetation from competition with juniper on up to 282 acres. Therefore, no significant cumulative impact is expected as a result of implementing this alternative.

3.13.4.5 Alternative 5
Direct and Indirect Effects

Landbird

Maintaining grazing levels in riparian areas to Modoc LRMP standards will protect Landbird habitat. The creation of livestock barriers and the fencing of the fen are expected to aide in maintaining riparian vegetative structure important to many of the landbirds in the allotments. The decrease in juniper is expected to cause a corresponding increase of sage, grasses, and forbs; species dependent on sage and grasslands are anticipated to benefit from sage steppe restoration. Finally, species dependent on eastside pine, mixed conifer, or snag habitat within these vegetative types are expected to be unaffected by livestock grazing or juniper felling.

Bald eagle (Forest Service Sensitive Species)

The effects of this alternative are similar to Alternative 2 even with the higher number of livestock, due to the low use of riparian areas by livestock within occupied and potential bald eagle habitat.

Greater sage-grouse

The effects of this alternative are similar to Alternative 2 even with the higher number of livestock, due to the low probability of sage-grouse use in the three allotments.

Sagebrush Habitat for Greater Sage Grouse

The effects of this alternative are similar to Alternative 2 even with the higher number of livestock, due to monitoring data indicating the light to moderate use of upland vegetation within the analysis area.

Western Bumble Bee

Potential negative impacts to western bumble bee habitat resulting from alternative 5 would include:

- continued cattle grazing which may lead to reductions in floral resources, (reduction of cattle use of West Valley Allotment would lessen this potential impact),

- trampling of rodent burrows and disturbance of grass clumps (potential bumble bee nest sites) by cattle (reducing cattle grazing on West Valley Allotment would lessen this potential impact).

Potential beneficial impacts to western bumble bee habitat of alternative 4 would include:

- release of nutrients as a result of pile burning may increase floral resources adjacent to pile burns,
- greater availability of floral resources on 1,646 acres where junipers would be subject to removal, due to increased availability of sunlight, water and nutrients to flowering plants and better seedbeds due to reduced accumulations of duff on soil surfaces,
- fewer potential impacts of cattle grazing and trampling on West Valley Allotment due to reduction in cattle use,
- retention of water developments which provide important water sources for bumble bees and other wildlife.

Yellow Warbler (Riparian Habitat)

The potential effects of grazing from this alternative would be the same as Alternative 2.

Pacific tree frog (wet meadow habitat)

The potential effects of grazing from this alternative would be the same as Alternative 2.

Mule deer (Modoc LRMP Wildlife Species)

Potential beneficial effects for mule deer include:

- release of understory food plants on 1,364 acres of the study area through the removal of western juniper trees, which lack old growth characteristics,
- reduction in permitted levels of cattle grazing on the West Valley Allotment, and
- retention of water developments for cattle, which are also used by deer and other wildlife,
- junipers lacking old growth characteristics would be felled on 282 acres along the south fork of the Pit River and along Little Parsnip Creek for use as barriers to cattle trailing along streams. This action would help prevent watershed damage from trailing cattle and also would also reduce competition from juniper for sunlight, water and nutrients needed by understory plants which provide forage for deer.

Potential negative impacts of this alternative include:

- renewal of grazing permits on the study area at current permitted levels of grazing, which would allow competition with cattle for forage and space to continue, and
- retention of fences, which may constitute barriers and hazards to deer.

Cumulative Effect

The cumulative effects associated with this alternative would the same as those discussed under Alternative 2 for Bald eagle, Greater sage-grouse, Sagebrush Habitat for Greater Sage Grouse, Western Bumble Bee, Yellow Warbler (Riparian Habitat) and Pacific tree frog (wet meadow habitat)

Mule deer (Modoc LRMP Wildlife Species)

Western juniper encroachment on and adjacent to the project area has been significant in recent decades. This alternative would reduce juniper on up to 1,646 acres, thus reducing the effects of competition from western juniper on important forage plants. While there has been some juniper reduction due to wildfire over the past half century, the general trend is toward increasing juniper on and adjacent to the project area.

Continuation of permitted grazing by cattle over a relatively short grazing season per management standards may have a limited negative impact on mule deer, but would likely be significantly reduced or cancelled by the positive effect of releasing the understory vegetation from competition with juniper on up to 1,646 acres. Therefore, no significant cumulative impact is expected as a result of implementing this alternative.

3.14 Legal Regulatory Compliance and Consultation

The Warner Mountain Ranger District operates under a diverse array of local, state and federal management guidance and policy as well as various executive orders. Currently, the Warner Mountain Ranger District is guided by the Modoc National Forest 1991 Land and Resource Management Plan (LRMP, 1991) and the 2004 Sierra Nevada Forest Plan Amendment (SNFPA, 2004) supplemental EIS and ROD.

3.14.1 Principle Environmental Laws

3.14.2 National Environmental Policy Act

The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) requires that federal agencies rigorously explore and objectively evaluate all reasonable alternatives and briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 Code of Federal Regulations [CFR] 1502.14).

The South Warner Grazing EA meets the CEQ regulations requiring public scoping and a thorough analysis of issues, alternatives and effects as detailed in this report in the section: “Public Involvement and Issues” on page 28 of this document.

3.14.3 National Forest Management Act

The National Forest Management Act (NFMA) reorganized, expanded and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on national forest lands. The NFMA Act requires the Secretary of Agriculture to assess forest lands, and to develop a management plan for each unit of the National Forest System (NFS).

The Forest Service is complying with the provisions of this law by designing the project to meet the Standards and Guidelines of the Modoc National Forest Land Management Plan and its amendments.

3.14.4 Endangered Species Act

The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not be likely to jeopardize the continued existence of a TES or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible federal agency to consult with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE to ensure management activities are not likely to jeopardize the continued existence of a TE, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in the Wildlife and Botany Biological Evaluations (BE) and is summarized or referenced in Chapter 3.

3.14.5 Prime Farm, Range, or Forest Land

The Alternatives comply with the Federal Regulations for prime land. No 'prime' forestland or farmlands would be affected. The analysis area does contain prime rangeland within the three allotments. By designing the project to meet the Standards and Guidelines of the Modoc National Forest Land Management Plan and its amendments the allotments containing prime rangeland will produce forage. The assessment of prime rangeland can be found in the Range specialist report in Chapter 3.

3.14.6 Potential Conflicts with Plans or Policies of Other Jurisdictions

- Effects on threatened, endangered, and sensitive species are disclosed earlier in this chapter and in the Biological Evaluations for plants, fish, and terrestrial wildlife contained in the project record. There would be no adverse effects on any species to threaten viability.
- The Alternatives comply with State and Federal air quality regulations because there would not be any effect on air quality.
- None of the Alternatives would conflict with American Indian treaty rights or provisions. The Pit River Tribe was consulted regarding this project but they did not respond with any concerns.

Best Management Practices would be implemented to meet State and Federal water quality regulations.

3.14.7 Wildlife and Fisheries

Consultation with USFWS

A list of TE species provided by the "Federal Endangered and Threatened Species that may be affected by Projects on the Modoc National Forest", accessed through the USFWS county list

web page, was used for analysis. Based on the analysis conducted in the BE, it was determined that there are no TE species within the analysis area and no effects to listed species would occur from implementation of the South Warner Grazing EA. Therefore, no consultation under Section 7 of the Endangered Species Act of 1973, as amended was required.

California Department of Fish and Game
Input specific to the South Warner Grazing EA was solicited from the Department of Fish and Game through the public scoping process. No response was received.

3.14.8 Botany
The latest US Fish and Wildlife Service (USFWS) species list for Modoc County, in which the project occurs, was accessed from the USFWS website. This list fulfills the requirements to provide a current species list pursuant to Section 7(c) of the Endangered Species Act, as amended.

3.14.9 Clean Water Act
Section 208 of the Clean Water Act required the States to prepare non-point source pollution plans, which were to be certified by the State and approved by the Environmental Protection Agency (EPA). In response to this law and in coordination with the State of California Water Resources Control Board (SWRCB) and EPA, Region Five began developing Best Management Practices (BMPs) for water quality management planning on National Forest System lands within the State of California in 1975.

The South Warner Grazing EA meets the Clean Water Act by implementing the Best Management Practices of the Soil and Water Conservation Handbook. By using BMPs, the South Warner Grazing EA meets this Act according to the ROD of the SNFPA (Section VII, ROD of the SNFPA, 2004).

3.14.10 Clean Air Act
The Clean Air Act provides the principal framework for national, state and local efforts to protect air quality. Under the Clean Air Act, the Office of Air Quality Planning and Standards is responsible for setting standards for pollutants that are considered harmful to people and the environment. The 1990 Clean Air Act is the most recent version of a law first passed in 1970.

All pile burning that would be done on the South Warner Grazing EA would be in accordance with an approved smoke management plan approved by the Modoc County Air Pollution Control District. Burns are conducted during approved burn days, when atmospheric conditions favor smoke dispersion. Pile burning takes place in early spring or late fall when the forest duff layer is moist or snow covered to reduce the potential for fire escape.

3.14.11 National Historic Preservation Act
Section 101 of the National Environmental Policy Act (NEPA) requires the Federal Government to preserve important historic, cultural and natural aspects of our natural heritage. To accomplish this, federal agencies use the Section 106 process of the National Historic Preservation Act (NHPA). This process has been codified in 36 CFR 800 Subpart B. The coordination or linkage between the Section 106 process of the NHPA and the mandate to preserve our national heritage under NEPA is well understood and is formally established in 36 CFR 800.3b and 800.8. Locally, the Modoc National Forest uses a programmatic agreement (PA) between Region 5 of

the US Forest Service, the California State Historic Preservation Officer and the Advisory Council on Historic Preservation to implement the Section 106 process.

The South Warner Grazing EA meets NHPA by protecting cultural resources through field survey, tribal consultation and avoidance of sites in the South Warner Grazing EA area. Boundaries of all known archaeological and historic sites within the South Warner Grazing EA area have been identified. As outlined in the Programmatic Agreement, protection measures would be implemented, as appropriate, for all cultural resources located within the project area. The application of the protection measures would result in the South Warner Grazing EA having "no effect" on archaeological or historic sites listed on or eligible for the National Register of Historic Places and The Forest would have taken into account the effect of the project on cultural resource sites in compliance with the PA and Section 106 of the NHPA.

3.14.2 Executive Orders

3.14.2.1 Executive Order 11988 – Floodplain Management

Issued May 24, 1977, this Executive Order requires agencies to provide leadership and take action to minimize adverse impacts associated with the occupancy and modification of floodplains and reduce risks of flood loss;
http://www.archives.gov/federal-register/codification/executive-order/11988.html.

None of the proposed Alternatives would result in an action resulting in an adverse impact resulting from any occupancy or modification of floodplains. No occupancy is proposed and any change in use within floodplains will improve over the existing condition. This EA meets the intent and is in compliance with this Executive Order.

3.14.2.2 Executive Order 11990 – Protection of Wetlands

Issued May 24, 1977, this Executive Order requires agencies to take actions to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands;
http://www.archives.gov/federal-register/codification/executive-order/11990.html.

The Alternatives will either remove livestock (Alternative 1) or will improve livestock distribution and use (Alternatives 2, 3, 4, & 5), which in turn will allow for some recovery and reduced utilization of currently high use wetland areas. No new construction is proposed to be located in wetlands. The South Warner AMP meets the intent and is in compliance with this Executive Order.

3.14.2.3 Executive Order 12898 Consumers, Civil Rights, Minority Groups, Low Income Populations, and Women

Executive Order 12898 (59 Fed. Reg. 7629, 1994) directs Federal Agencies to identify and address, as appropriate, any disproportionate adverse effect to minority or low-income populations. None of the activities proposed would have disproportionate effects on low income

or minority populations. None of the Alternatives would negatively affect women, American Indians, other minorities, or consumer groups. Civil Rights would not be affected by any of the Alternatives. The project includes both permittee and Forest Service employee accomplished work. The U.S. Department of Agriculture prohibits discrimination in its employment practices based on race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital and family status.

3.14.2.4 Consultation and coordination with Indian Tribal governments, Executive Order 13175 of November 6, 2000

The following tribe was consulted during the NEPA scoping phase of the South Warner Grazing EA:

- The Pit River Tribe

3.14.2.5 Indian Sacred Sites, Executive Order 13007 of May 24, 1996

Through scoping and consulting with local Native American tribes, it was determined that there were no Indian sacred sites in the project area.

3.14.2.6 Invasive species, Executive Order 13112 of February 3, 1999

Executive Order 13112 created the Invasive Species Council (ISC) to order to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human-health impacts that invasive species cause. Federal agencies are required to:

- Identify actions that may affect the status of invasive species
- Use relevant programs and authorities to prevent the introduction, control and monitoring of invasive species
- Provide for native-species restoration as well as their habitats
- Promote public information
- Not condone or carry out actions that may spread invasive species
- Consult with the ISC and other stakeholders as appropriate

The South Warner Grazing EA meets the Executive Order by following the noxious weed management Standards and Guidelines in Appendix A of the ROD for the SNFPA. The SNFPA guidelines direct proactive management of noxious weeds that meet with the Executive Order. The Forest botany staff carries out the intent of the Executive Order and the noxious weeds Standards and Guides by:

- Identifying and controlling weed infestation areas by conducting a Noxious Weed Risk Assessment
- Preventing the spread of noxious weeds through standard operating procedures and site-specific mitigations and weed treatments
- Educating the public regarding the presence and spread of noxious weeds

3.14.2.7 Roadless Area Conservation and Inventoried Roadless Areas and Potential Roadless Areas

The Parsnip Inventoried Roadless Area (IRA) is within the South Warner Grazing Analysis on the Warner Mountain Ranger District of the Modoc National Forest. The proposed action includes the felling of generally small diameter juniper in approximately 98 acres of the West Valley Treatment Area and the entire Little Parsnip Creek (157 acres) within the designated Inventoried Roadless Area (IRA) as defined in 36 CFR 294.11.

36 CFR 294 Subpart B – Protection of Inventoried Roadless Areas includes the definition, characteristics and prohibitions of roadless areas. 36 CFR Part 294.13 of Subpart B states timber may be cut, sold or removed in IRA's if the Responsible Official determines that the following circumstance exists:

The cutting, sale or removal of generally small diameter timber is needed for one of the following purposes and will maintain or improve one or more of the roadless area characteristics as defined in 294.11.

> (i)To improve threatened, endangered, proposed or sensitive species habitat; or
>
> (ii) To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period.

The rule also states that due to great variation in stand characteristics between vegetation types in different areas a definition of what constitutes generally small diameter timber is not specified in the rule. Such determinations are to be made through project specific or land and resource management plan NEPA analyses, as guided by ecological considerations.

The proposed treatments will remove only non-old growth western juniper. The existing condition described on page 7 of the Silviculture report as well as Analysis of the Effects of Treatment on pages 12 and 13 demonstrate that the majority of trees removed will be from the lower diameter classes. "Generally small diameter" in these stands is represented by a combination of dbh and their physical characteristics with respect to old growth attributes rather than a pure function of dbh.

Western juniper is generally not considered a "timber" species as specified in the roadless rule. This is a tree species that typically occupies open sagebrush grasslands and is managed as range species and not for commercial timber value or timber associated wildlife habitat. As described in the roadless rule, determination of what constitutes "generally small diameter timber" will consider future effects and development of the stands and relationships with associated plant and animal communities on the site and surrounding landscape.

By implementing the Sage Steppe Ecological Restoration Strategy listed above the proposed treatments will restore these areas to desired habitat conditions reflecting ecological processes that existed pre- European settlement. Treatments will increase the diversity of plant and animal communities, and return the areas to a condition that is more representative of a natural

appearing landscape. These are both listed characteristics of a roadless area as per 36 CFR 294.11.

CHAPTER 4: CONSULTATION and COORDINATION

The U.S. Forest Service operates under the Endangered Species Act (ESA) which requires consultation with the U.S. Fish and Wildlife Service regarding impacts to potential endangered species from the Proposed Action and the action alternatives. Consultation is also done with federally recognized tribes to ensure that heritage resources are respected and would not be impacted by any potential project activities.

The Modoc National Forest consulted with the following organizations in preparing this document:

Federal, State and Local Agencies

- U.S. Fish and Wildlife Service (Klamath Falls Field Office)
- Central Valley Regional Water Quality Control Board
- California Department of Fish and Game
- Modoc County Board of Supervisors
- Modoc County Cattleman Association
- Modoc Land Use Committee
- Modoc-Washoe Experimental Stewardship Committee

Other

- Rodney Flournoy – Outlet Permittee
- McGarva Ranch – West Valley Permittee

Tribal Consultation

- The Pit River Tribe (Main Council)

List of Preparers

- Adrian Cuzick- Rangeland Management Specialist/Project Team Leader
- Vicki Adkison- Archaeologist
- John Clark – Wildlife Biologist
- Roy Cuzick- Silviculturist
- Mark Deperro- Forest Fuels Specialist
- Mary Flores- Wildlife Biologist
- Gerry Gates- Archaeologist
- Forest Gauna- Botanist
- Sue Goheen- Soils Scientist
- Amy Hartell- Recreation Specialist
- Eric Moser – Hydrologist
- William Reading- NEPA
- Tracy Silva- Geographic Information Specialist
- Chris Stewart- Hydrologist

- Marty Yamagiwa- Aquatics Biologist

Appendix A: Forage Utilization Monitoring Results

In separate file.

Appendix B: Summary of Public Involvement Process

In separate file.

Appendix C: Map of Proposed and Existing Range Improvements

In separate file.

Appendix D: Monitoring Plan

In separate file.

Appendix E: Best Management Practices

In separate file.

Appendix F: Summary of Past, Present, and Reasonably Foreseeable Actions

In separate file.

Appendix G: Miscellaneous Maps

In separate file.

Appendix H: Literature Cited

In separate file.